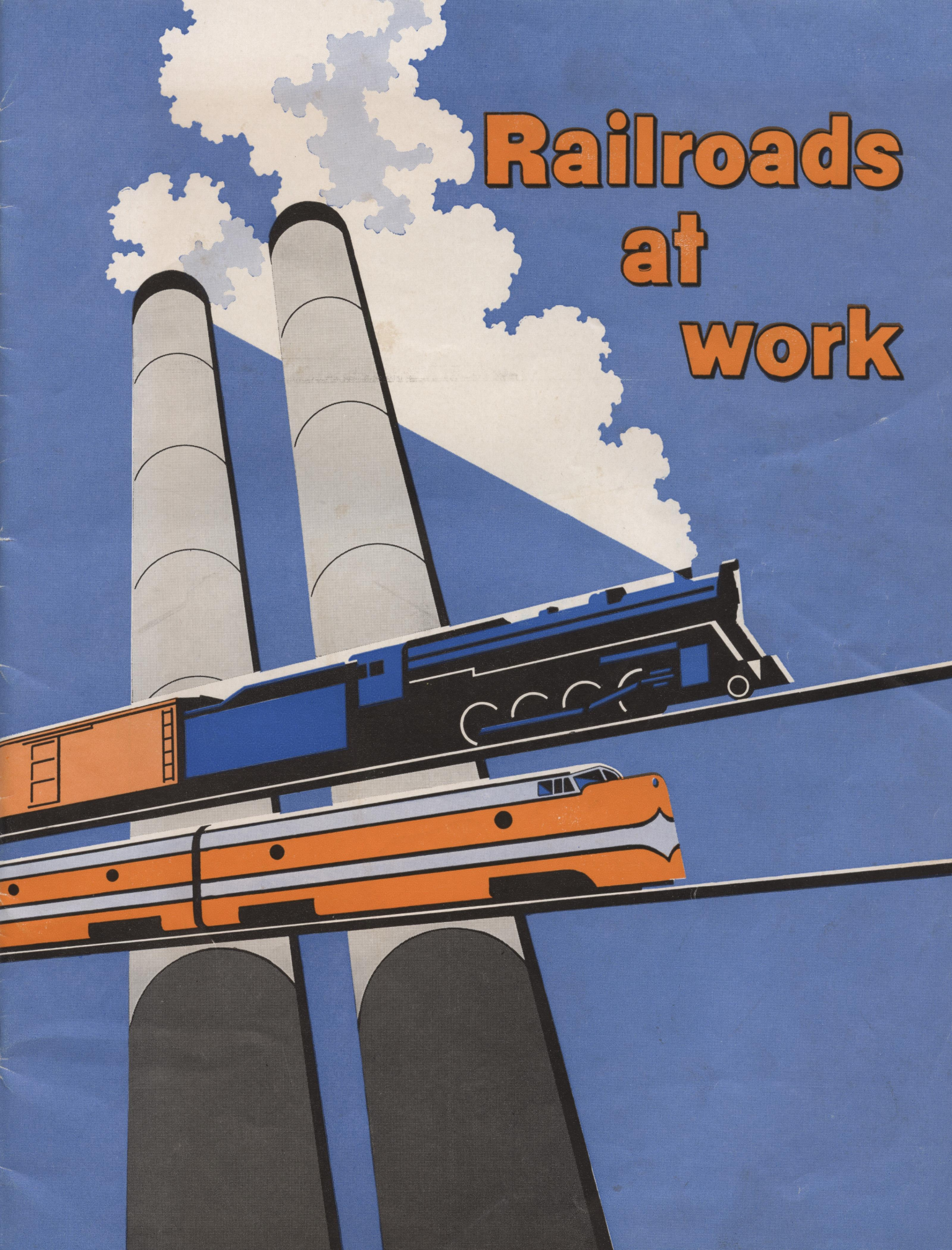
Railroads at work



THIS BOOK BELONGS TO

NAME .....

SCHOOL .....

HOME
ADDRESS .....

RAILROADS AT WORK

A Picture Book of the American Railroads in Action

SIXTH EDITION (Rev.)

TO TEACHERS

This booklet is designed for the use of pupils engaged in a study of transportation, and may be obtained in quantity for that purpose. It is keyed to the *Teacher's Kit for a Study of Railroad Transportation* which is available *only to teachers.*

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ASSOCIATION OF AMERICAN RAILROADS

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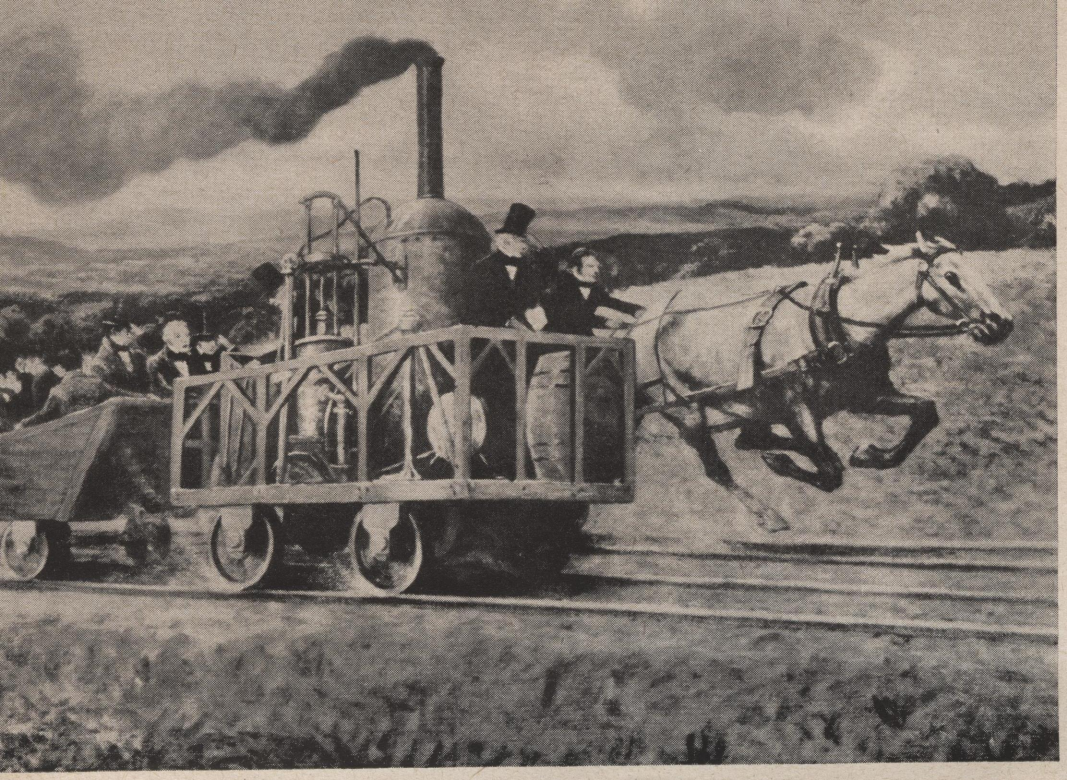
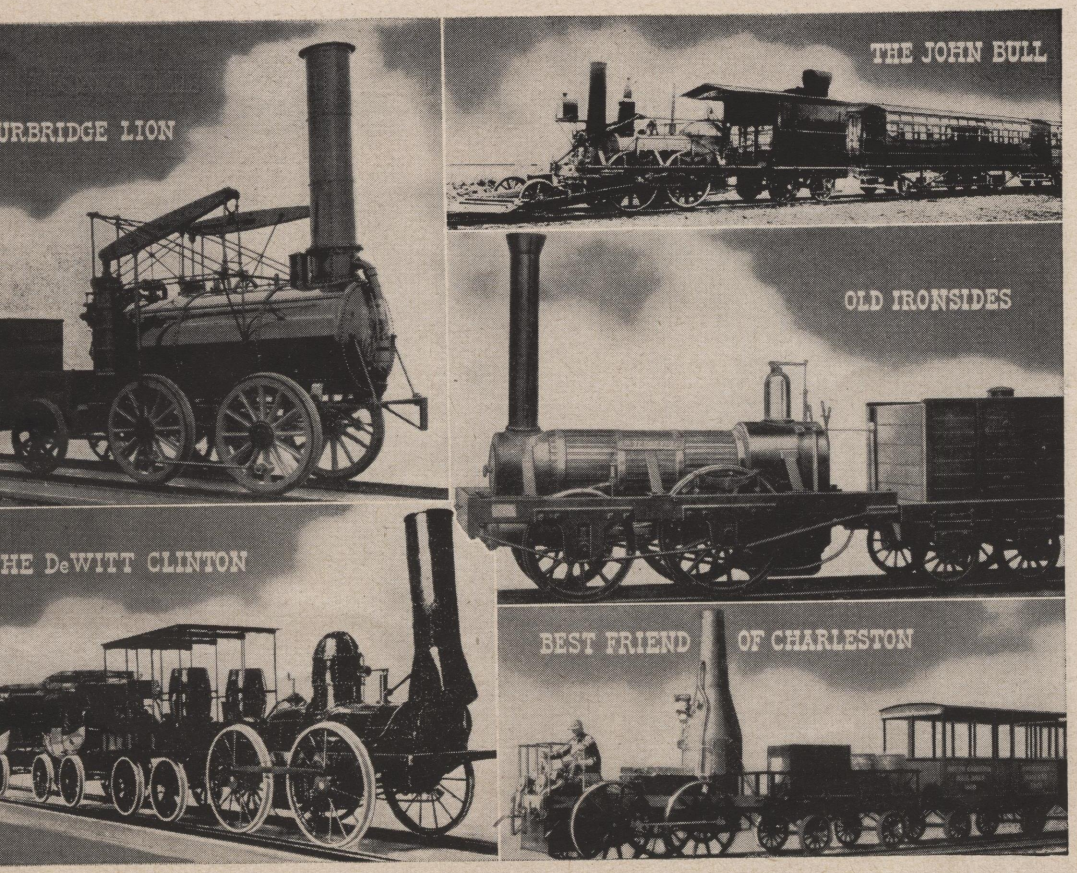


RACE OF IRON HORSE AND HORSE CAR

1 Many years ago men found a way to make steam run a machine. This machine was called a steam engine. Years later in England, George Stephenson and other inventors put a steam engine on wheels and made it run over a road of rails. This traveling steam engine was called an "Iron Horse."

In 1829, Peter Cooper, American inventor, built an Iron Horse. It was so small that he called it *Tom Thumb*. It was the first Iron Horse in America to haul passengers. On a trial trip near Baltimore, the Iron Horse and a real horse tried to see which could go the faster. For a while the Iron Horse was ahead. Then it broke down, and the real horse won the race!



"PUFFING BILLIES"

2 As years went by, other and better Iron Horses were built and many roads of rails were made for them to run upon. Some people called the engines "Puffing Billies." But the name which finally came to be used was LOCOMOTIVES.

This picture shows five famous locomotives of the days when railroads were young. They are: *Stourbridge Lion,* first British locomotive tried out in America; *DeWitt Clinton,* first to pull a train in New York State; *John Bull,* first to pull a train in New Jersey; *Old Ironsides,* first in Philadelphia; and, *Best Friend of Charleston,* first locomotive to pull a train of cars and the first locomotive to be placed in regular service in America.

RAILWAY STATION AND TRAIN IN THE 1860's

3 This is a typical railway station and train about the time Abraham Lincoln became President. Locomotives were then larger and stronger than the first Iron Horses, but they would look small indeed beside today's big engines. In the picture, we also see an ox cart, drayman's wagon, carriage, cab, and stagecoach—all in common use in Lincoln's time.

Many railroads were then being built. They opened new regions. Settlers flocked in. Farms and factories were started. Mines were opened. Villages grew up around railway stations. Many of them became important towns and cities. Schools and colleges were founded. Churches were built. America was fast becoming a great nation.

THE GOLDEN SPIKE CEREMONY

4 One of the great events in American history was the completion of the first chain of railroads to the Pacific Coast. This picture was taken in 1869, a few minutes after the Golden Spike was driven at Promontory, in the mountains of northern Utah. A locomotive from Sacramento and a locomotive from Omaha touched "noses" to symbolize the new bond between East and West. The event was celebrated from coast to coast.

Railway transportation brought the Atlantic and Pacific regions within a few days' travel of each other. Since then the time has been shortened to less than three days.

7 The modern trend in passenger service is the fast streamlined train. This type of train is usually built of strong but lightweight metals, and it weighs less than a standard passenger train.

Some are pulled by steam locomotives, as shown in the bottom picture. Most streamlined trains are pulled by Diesel locomotives, as shown in the top picture.

The Diesel locomotive has an oil-burning engine and a generator which supplies electric current to drive the locomotive.

Streamlined trains are air-conditioned. Sealed windows shut out dust, smoke, cinders, and drafts and reduce outside train noises.

STREAMLINED PASSENGER TRAINS

PASSENGER STATION IN A BIG CITY

8 Nearly every town and city has a railway passenger station. The size of a station usually depends upon the number of passengers handled. At the station, we buy tickets for our trip, check our baggage, and board our train. Sometimes we go to the station to meet friends who are arriving by train or to bid good-bye to friends who are going away.

In a large railway station, like the one in the picture, there are ticket offices, information booths, waiting rooms, baggage rooms, lost-and-found offices, parcel check rooms, lockers, telegraph offices, telephone booths, restaurants, newsstands, and stores.

11 Every train runs on a definite schedule. It must arrive at each station and meet and pass other trains according to schedule, or according to orders issued by the train dispatcher. The conductor and engineer and every member of the train crew must carry watches that keep correct time. Watches must be cleaned and inspected regularly. In the picture we see the conductor and the engineer. They are comparing the time of their watches before starting on their trip or "run."

CONDUCTOR AND ENGINEER COMPARE WATCHES

LOCOMOTIVE ENGINEER IN THE CAB

12 Ever since there were trains, boys have been wishing they could be locomotive engineers. The engineer sits in the cab and runs the big engine. By pushing buttons or moving levers he can start the locomotive, make it go fast or slow, bring it to a stop, or make it go forward or backward.

This picture shows an engineer in the cab of a Diesel-electric engine. The engineer and fireman must have good eyesight and steady nerves. They must know train rules and signals. When out on their run one or the other must keep constant watch to make sure the track is clear.

STEAM PASSENGER TRAIN

5 This is one of the many thousands of passenger trains that start on their runs in the United States each day. Steam, electric, and, more and more, Diesel-electric engines are used.

Today's railroads and trains differ in many ways from those of long ago. Tracks are stronger, heavier, and smoother. Locomotives are larger and more powerful. Then, most passenger cars were built of wood. Today, most passenger cars are built of metal. Then, cars were lighted by gas or kerosene. Today, cars are lighted by electricity. They are also air-conditioned, with temperature and ventilation controlled at all seasons.

ELECTRIC PASSENGER TRAIN

6 This passenger train is pulled by an electric locomotive. On the roof of the locomotive are two steel frames, called pantographs. One pantograph is folded. The one at the far end is opened. The top part touches the overhead wires which are charged with electricity. The locomotive draws electricity from the wires.

Electric locomotives carry no coal and very little water. Thus, they do not need tenders. They can go forward or backward with equal ease. They do not have to be turned around.

BUYING TICKETS IN THE STATION

9 The people in the picture are buying tickets to ride on trains. The men in the ticket windows are the ticket sellers.

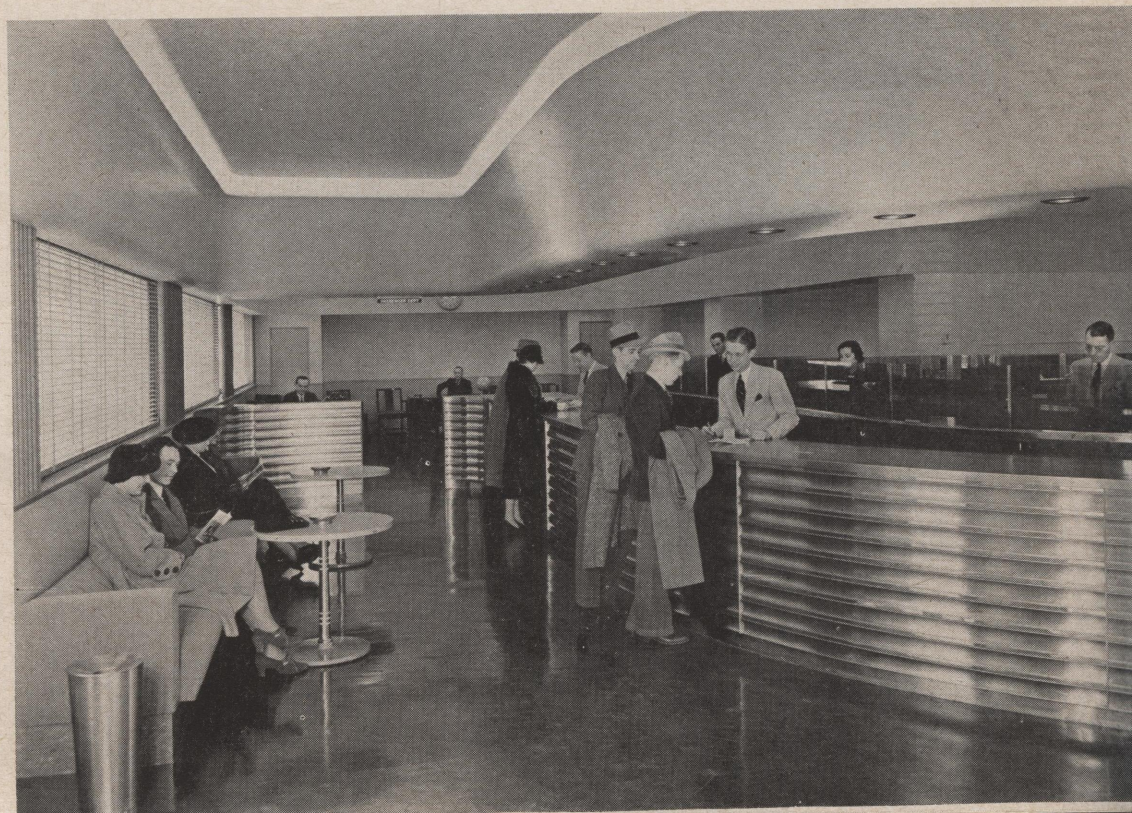
There are many kinds of railroad tickets — one way, round-trip, excursion, suburban, coupon, coach, and Pullman tickets. A Pullman ticket buys night sleeping space, or a reserved seat or private room on the train during the day. Children under five may travel free when accompanied by parent or guardian. There are half-fare tickets for children five to twelve.

Each ticket bears a number and shows the station where the journey starts and the station where it ends. The date is stamped on the back of the ticket.

10 In large cities, railroads have ticket offices in the downtown business districts as well as in the railroad stations. These are called city ticket offices. They are usually located near the hotel and shopping districts, convenient for large numbers of people.

At the city ticket office one may buy a railroad ticket or a Pullman ticket. Here one can also obtain information about railroad fares, train schedules, steamship connections, and other matters of interest to travelers. A city ticket agent is in charge of the office. He and his assistants will help one to plan a business or vacation trip.

CITY TICKET OFFICE



13 With watch in hand, the conductor signals to the engineer that it is time for the train to start. Then, as the train begins to move, the conductor steps aboard.

The conductor is in charge of the train. It is his job to carry out all orders concerning the movement of his train. He also sees that each member of the train crew observes the rules and performs his duties. He makes certain that the right "markers" or lights are displayed. He is in charge of taking up tickets, collecting fares, and calling out stations. In these duties, however, he is usually helped by one or more members of the train crew.

CONDUCTOR SIGNALS "ALL ABOARD"

IN A PASSENGER COACH

14 This is a passenger car—sometimes called a day coach. Air conditioning keeps the inside of the car cool in summer, warm in winter, and comfortable at all times. This car has double windows and thick walls to shut out noise. It has seats with backs which can be raised or lowered. Racks are provided for traveling bags and other personal belongings.

The porter is placing a passenger's bag in one of these racks. After the train starts, the conductor will go through the cars and take up the tickets.

TRAVELING IN THE PULLMAN CAR

17 The railroads and The Pullman Company provide parlor cars and sleeping cars for persons who like to travel in extra comfort and enjoy a night's sleep. One may purchase a reserved seat, lower berth, upper berth, section, roomette, bedroom, duplex roomette, duplex single room, compartment, or drawing room.

The upper-left picture shows a bedroom arranged for daytime travel. In the upper-right picture, the little girl is getting ready for bed in a compartment. In the lower-left picture, a family of four has a meal served in their drawing room. In the lower-right picture, a young traveler is greeted as she leaves the train.

RELAXING IN THE OBSERVATION CAR

18 Many passenger trains carry observation or lounge cars like the one in the picture. These cars are fitted with soft carpets, comfortable chairs, and sofas. They are the "living rooms" of trains.

An observation car is attached to the rear of the train. Large windows afford an excellent view of the passing scenery. In the car are tables for playing games or for refreshments, a writing table, and racks containing the latest magazines. Stationery and sometimes scenic post cards are provided free of charge by the railroad company. Many observation cars are equipped with radios.

21 While the train speeds along—night or day—clerks in the Railway Post Office car are busy sorting mail, making up mail pouches, and performing other duties. They help the Post Office Department and the railroads provide prompt and regular service to people in every part of the United States.

Railway postal clerks become very skillful in sorting and handling mail. They know hundreds of railway mail routes. They memorize many post offices and train connections. The postal clerk receives and puts off pouches of mail at nearly every station where there is a post office. Almost all of our mail comes by railroad train.

SORTING MAIL IN A RAILWAY POST OFFICE CAR

HOW THE TRAIN CATCHES A MAIL BAG

22 The mail crane at right enables a train to pick up a mail pouch without stopping or slowing down. The crane is located beside the railway track, usually near the station. The mail bag is attached to the crane just before the train is due.

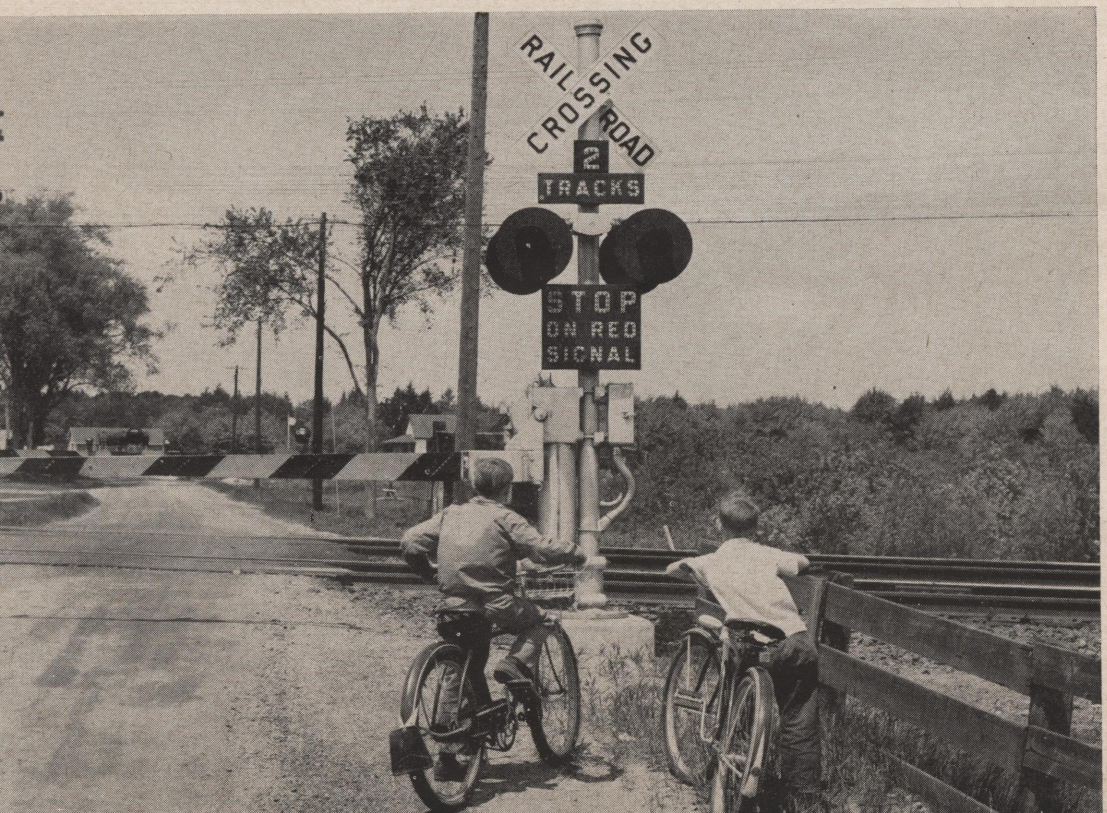
In the door of the post office car is a steel catcher arm. A postal clerk swings the catcher arm out so that when it passes the crane it snatches the mail bag where it is tied in the center, as seen in the picture. The arm is then swung inside the car. The mail bag is removed, and its contents are emptied on the sorting table.

29 Tunnels carry railroads below the surface of the earth. Like the bridge, the tunnel permits trains to run between cities by a more direct route; to pass through mountains, instead of around them; and to travel at a more level grade than would otherwise be possible. Tunnels also enable trains to pass under cities, rivers, and harbors.

There are more than 1,500 railroad tunnels in the United States. They range from 30 feet to nearly 8 miles in length. Some tunnels are built for one railway track only. Others are built for two or more tracks.

TRAIN ENTERING A TUNNEL

WHERE WE "STOP, LOOK, AND LISTEN"



30 The sign on the right informs motorists and pedestrians that this is a railroad crossing with two tracks. It tells them that they should stop on the red signal light.

Where traffic is heavy, crossings are protected by watchmen, or by gates, bells, flashing red lights, or other devices. When the train approaches a crossing, the engineer or fireman sounds the whistle, bell, or air horn —a warning to those on the highway.

We should remember that the only safe way to cross a railroad track is to *stop, look,* and *listen.* If a train is coming from either direction, we should wait until it has passed before crossing the tracks.

SIGNALS FLASH THEIR MESSAGES

33 Signals help to make the railroad train the safest form of transportation. Some signals, like those in the pictures, have messages for the eye. Some, like the locomotive whistle or bell, have messages for the ear. Men who run the trains know the language of signals. They tell the locomotive engineer when to stop, go slow, or go ahead at regular speed. Some signals are operated electrically from signal towers or stations. Many others are operated automatically by electric current flowing through the rails. On some railroads, lights flash on a small panel in the engine cab. These are called cab signals and give the same message as those beside the track.

FREIGHT TRAINS ON THE ROAD

34 Freight trains bring us most of the foods we eat, the fuel we burn, the clothes we wear, and the materials that are used in the construction and repair of our homes, streets, bridges, and public buildings. Freight trains help keep our factories supplied with the things they need. Factories depend upon freight trains to carry their products to distant markets. Thus, freight trains play an important role in our community, state, and nation. They form a link between farms and markets, forests and mills, mines and factories, and between factories and retail stores. Railroads carry things from where they are made to where they are needed.

15 Many passenger trains have dining cars where travelers may eat breakfast, luncheon, or dinner. A steward is in charge. He ushers his guests to their tables. There are tables for two and tables for four. Each guest is handed a menu. Many dining cars have special menus for children.

The white-coated waiters take the orders to the dining car kitchen. Here the food is placed on plates, picked up by the waiters, carried to the tables on large trays, and served.

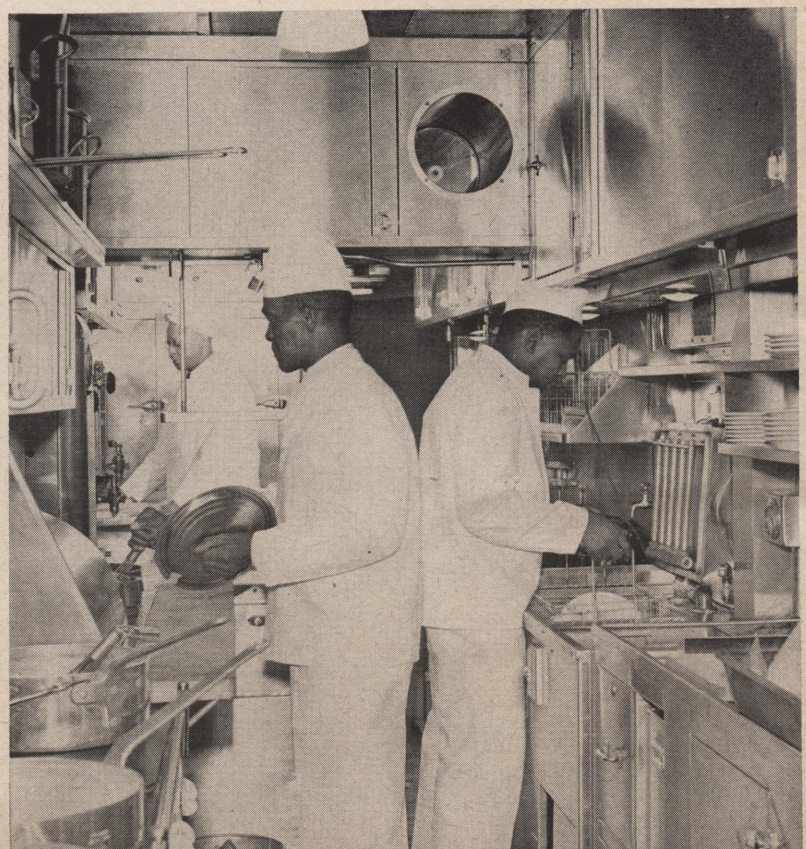
Wide windows give passengers a good view of the scenery while they enjoy their meals and relax in this comfortable train restaurant.

DINNER IS SERVED IN THE DINING CAR

PREPARING DINNER IN THE DINING CAR KITCHEN

16 Here is a part of the train that most passengers never see. It is in the kitchen that all the good things served in the dining car are prepared. The kitchen is long and narrow. It is fitted with stoves, mixing and serving tables, cupboards, and refrigerators. There is a place for everything and everything must be in its place.

The head cook, who is called the chef, is directly in charge of the dining car kitchen. As many as three assistants may help prepare the food. One man cooks the meats, another prepares the vegetables, and the third man makes salads, desserts, and cold plates.



19 The passenger terminal is the place where passenger trains begin and end their runs. After passengers have been discharged and express, mail, and baggage unloaded from an incoming train, the cars are taken to the yards. There, engines and cars are cleaned and inspected. In some terminals automatic washers clean the outside of the cars as the train passes between revolving brushes.

Passenger terminals have platforms for loading express, mail, and baggage. There are fuel and water stations for locomotives. The passenger station, engine terminal, various tracks, switches, signals, shops, and storehouses are all part of the passenger terminal.

PASSENGER TERMINAL FACILITIES

20 The baggage car is the storeroom of the train. It carries baggage for the passengers and business mail for the railroads. The man who checks baggage in the station is the baggage agent. The man who looks after the baggage car on the train is the baggageman.

You may take along trunks and handbags on your trip. You may keep one or more handbags in the passenger car. Those not needed during the journey and all trunks are carried in the baggage car.

Some railroads make a slight charge for checking baggage; others carry baggage free, within certain weight and size limitations.

LOADING THE BAGGAGE CAR

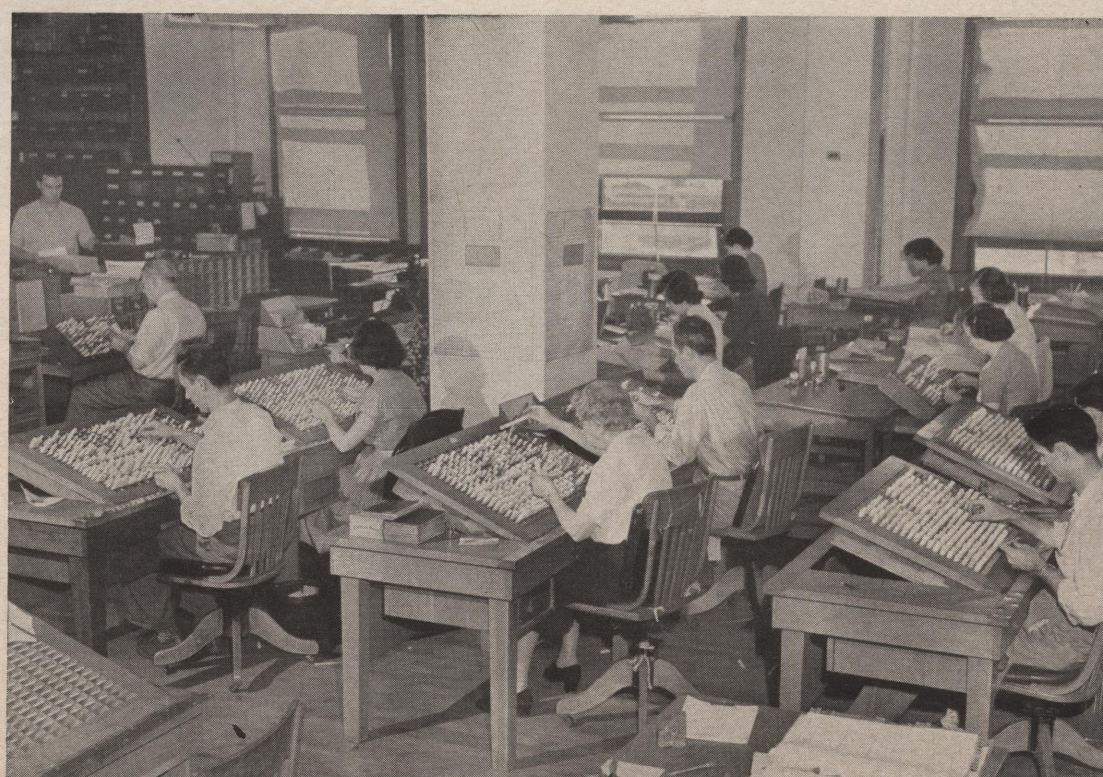
LOADING EXPRESS SHIPMENTS

23 The Railway Express Agency handles about 300,000 express shipments daily—over 109 million shipments a year. Some of these shipments are for short distances only; others are for points hundreds or thousands of miles away.

The Agency carries all sorts of things—in packages, boxes, crates, cases, bags, barrels, and other containers. Shipments include gems, works of art, money, toys, films, medical supplies, fresh food, flowers, animals—in fact, anything which requires special attention or quick delivery. Express service uses passenger and express trains. It also uses airplanes, steamships, and, for collecting and delivering express, more than 15,000 motor trucks.

KEEPING TRACK OF FREIGHT CARS

24 Many persons wonder how it is possible for each railroad to keep constant track of its wandering freight cars. This is done by an elaborate, nation-wide system of checks and reports. As soon as a freight car leaves its own railroad and moves onto the rails of another railroad, the agent at the junction point reports the interchange movement to the Car Record Office of his railroad. Thus, by daily telegraphic and written reports, the Car Record Office is kept informed of the progress of the car. Through these offices and a car's waybills, a car or shipment can be quickly located at any time.

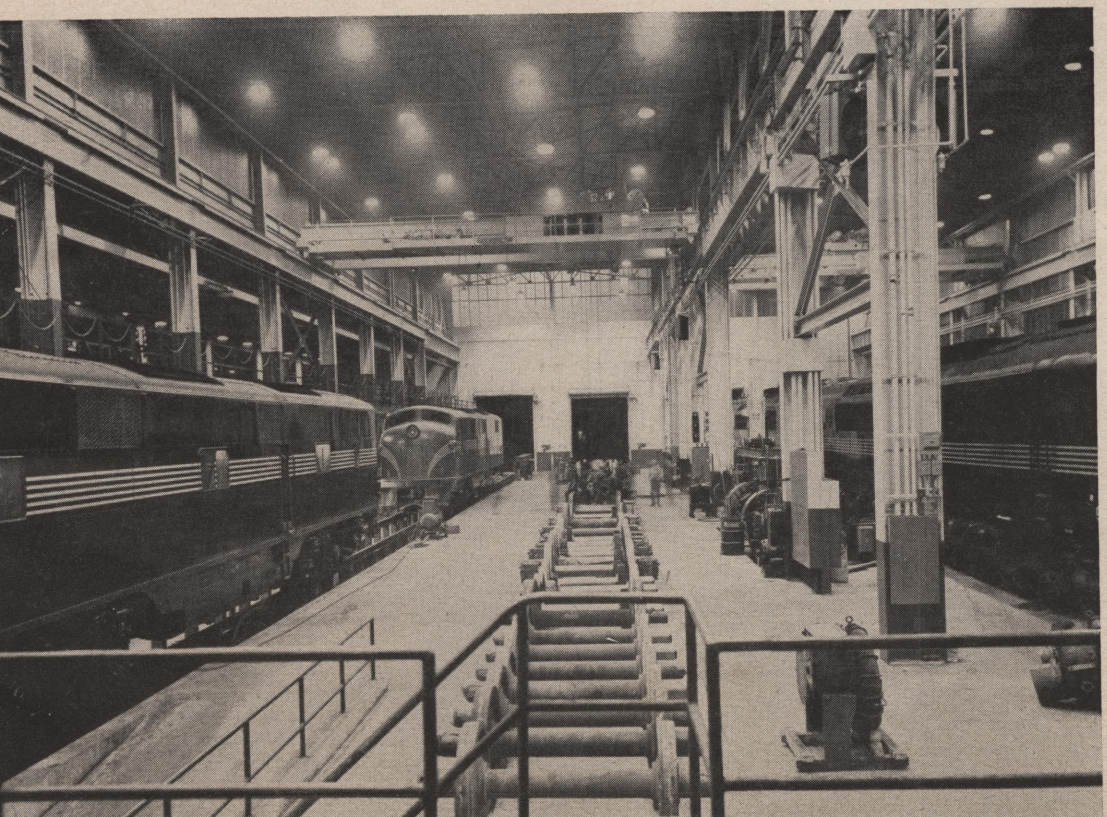


25 Here are two interesting features of the railroad—the roundhouse and the turntable. The roundhouse is usually a circular-shaped building with "stalls" for engines. Locomotives come to the roundhouse for cleaning and for light repairs.

The turntable is used for turning a locomotive around. It is a steel bridge-like structure, pivoted at the center and supported on each end by wheels which turn on a circular track. Tracks spread out from the turntable like the spokes of a wheel. In order to get into the roundhouse, the locomotive is run onto the turntable, which is then turned to the track leading to the particular stall to which the locomotive is to go.

ROUNDHOUSE AND TURNTABLE

IN THE LOCOMOTIVE SHOP



26 When a locomotive needs more repairs than can be made in the roundhouse, it is taken to a big railroad shop for "back shop" work. Here skilled mechanics repair or replace tubes, axles, wheels, brakes, or other worn-out parts, give it a fresh coat of paint, and make it almost as good as new. In the larger shops are huge overhead electric cranes which can pick up and carry a huge locomotive from one end of the shop to the other.

Among those who work in railroad shops are machinists, blacksmiths, boilermakers, crane operators, electric drill operators, lathe operators, patternmakers, welders, riveters, electricians, inspectors, metal workers, painters, and laborers.

27 Railroads employ many men who examine railway cars to make sure that they are in good condition. These men are called car inspectors. The car inspector must know many things about railroad cars and he must be thorough in his work. If he finds that a car is not in good condition, he reports it by number to his foreman, who arranges to have it repaired.

The car inspector examines both passenger and freight cars. He is constantly on the lookout for defects which might cause accidents or delays. He helps to keep our railroads safe.

CAR INSPECTOR AT WORK

SPANNING STREAM AND VALLEY

28 Bridges make it possible for trains to cross rivers and valleys and to run from one city to another by more direct routes.

There are about 190,000 railroad bridges of all kinds and sizes in the United States. The longest is twelve miles in length. Most are made of concrete and steel. The principal kinds of bridges are *deck plate girder, deck truss, through truss, suspension, cantilever, viaduct,* and *trestle.*

The "legs" of the bridge are called *piers.* The section between two piers is called a *span.* The "floor" of the bridge where the tracks are located is called the *deck.*

31 With a locomotive crane to do the heavy lifting, the men are taking up old and worn rail and laying new rail in its place. In this and many other ways, the railroad keeps its tracks in good condition. Other groups of men, called section crews, replace crossties, spikes, and other parts of the track when the old ones wear out. An experienced foreman is in charge of each crew.

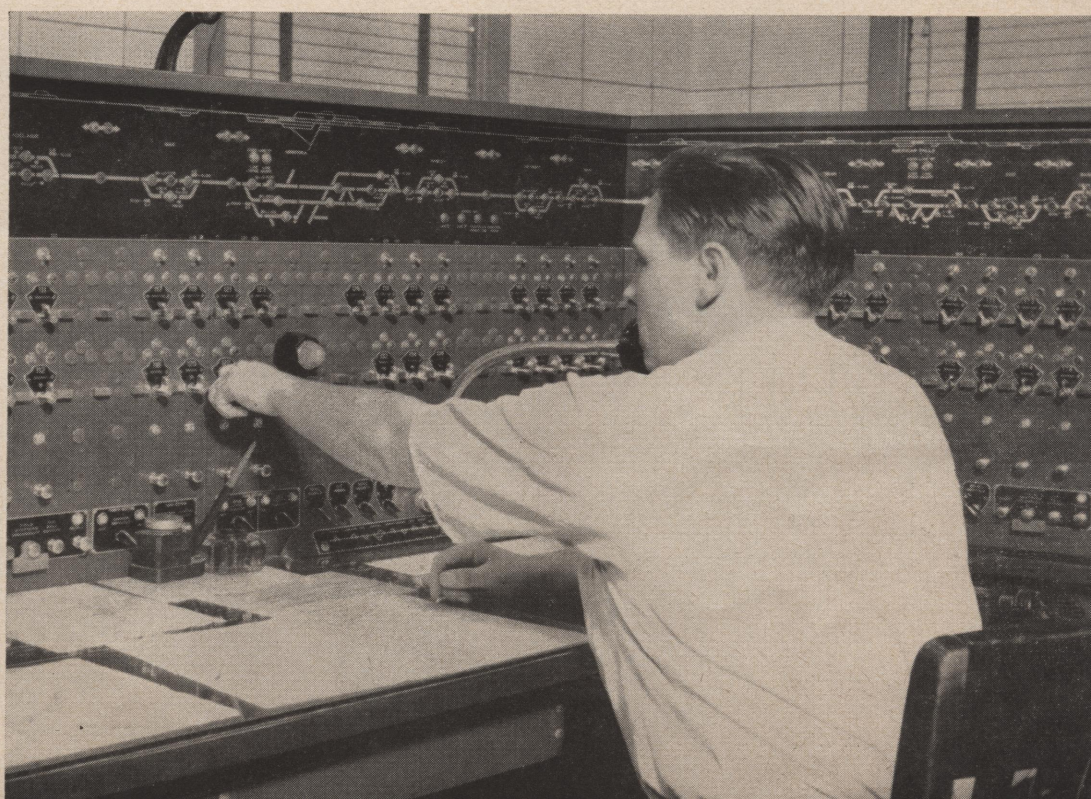
Our railroads have many crews of workmen whose job is to keep tracks, bridges, trestles, tunnels, telephone and telegraph wires, and signals in good condition, just as roundhouse and shop workers keep locomotives and cars in good condition.

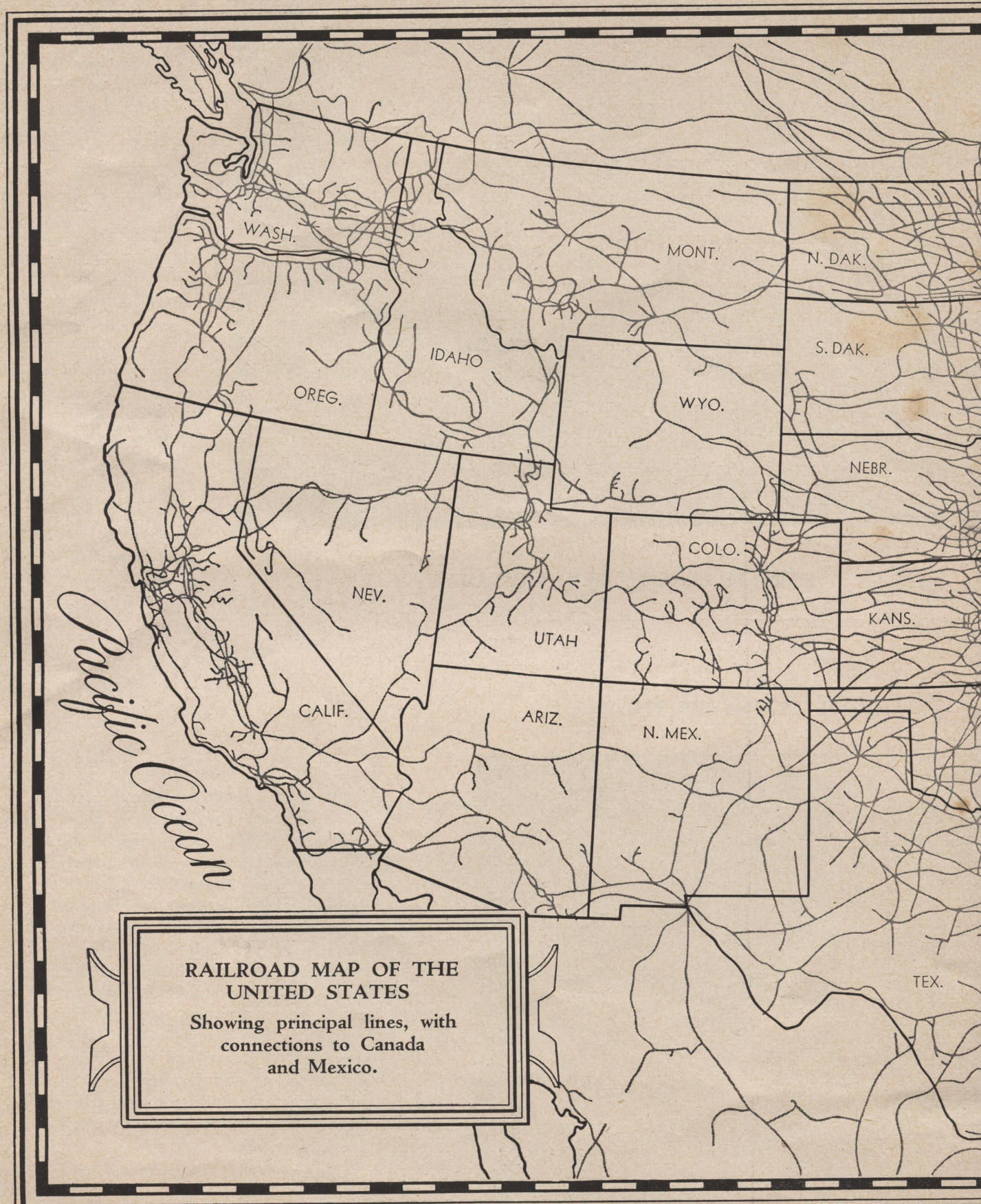
TRACK REPAIRMEN AT WORK

32 The train dispatcher controls the movements of trains. On the large sheet before him, he keeps an up-to-the-minute record of every train running on his division or district. If he directs trains to meet at a certain place, they must do so. In this way, trains arrive, depart, meet, and pass, safely and without confusion.

Some dispatchers direct train movements by telephone, telegraph, or by radiotelephone. Others use control machines which set signals and switches over many miles of track. This method is called centralized traffic control or C.T.C. The picture shows the dispatcher at the control panel of a C.T.C. machine.

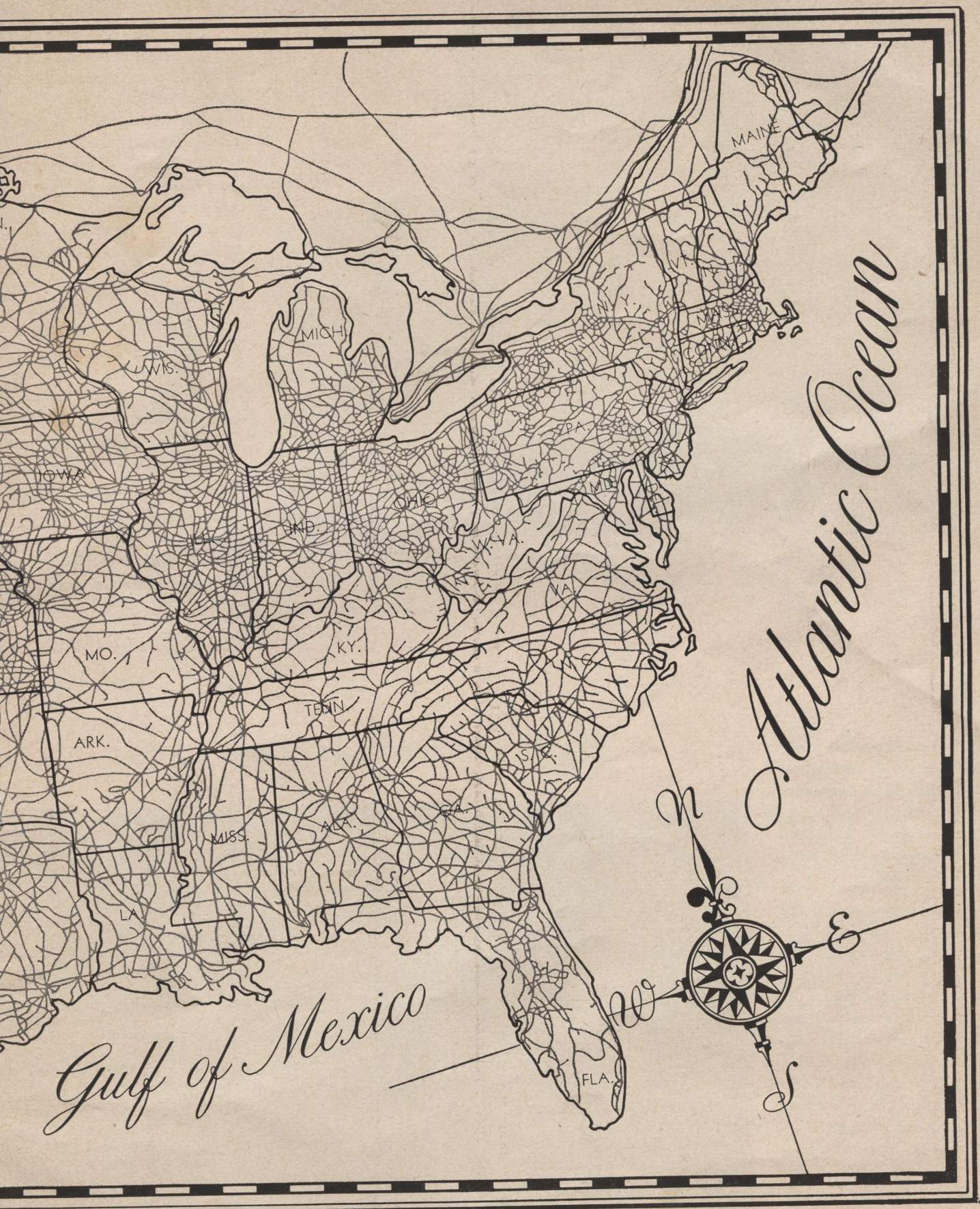
TRAIN DISPATCHER





THE AMERICA

Across the vast American continent, from northern woods to tropical seas, from ocean to ocean, spreads the gre network of railroads—busy arteries of our economic life—linking farms with consuming centers, mines with factories, fores with mills, mills and mines and farms and factories with markets, and connecting all with the seaports. Over the 279,000 mil



ILWAY SYSTEM

of railroad in the United States, Canada, and Mexico—more than one-third of the world's total—speed many thousands of passenger and freight trains daily. Tracks and equipment are so standardized and services and operations are so coordinated that passengers, freight, express, and mails move from any station to any one of the thousands of other stations.

CABOOSE

35 At the end of each freight train is a caboose, with its little watchtower, or cupola. The caboose is the office of the freight train. Here the conductor has a desk where he keeps freight tickets or waybills and other papers, and prepares a report showing the origin, destination, and contents of the train.

In the cupola, the brakeman keeps a careful watch on the long train of freight cars ahead and watches for signals from the head-end brakeman, engineer, or fireman. The caboose has a stove, lockers for clothing, and places for flags, lanterns, and emergency tools. Some cabooses have bay windows on the side for observation instead of cupolas.

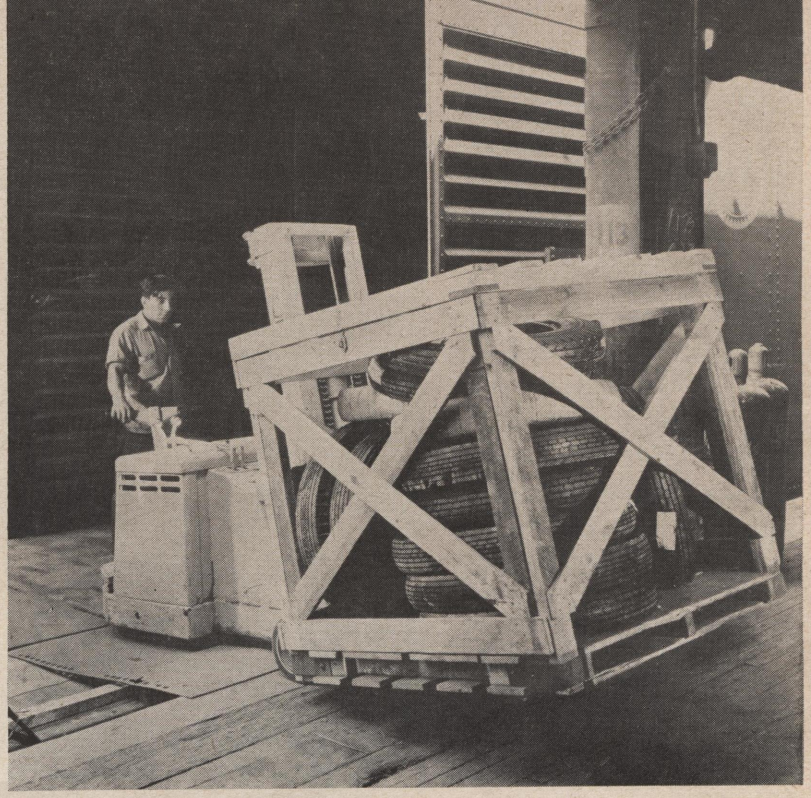
36 A train crew is made up of a conductor, engineer, fireman, and one or more brakemen. On a passenger train the baggageman is also a member of the train crew.

The brakeman assists the conductor. He sees that everything needed for the trip is in place on the train. On local freight trains he helps to load and unload freight at stations. He also helps to set out and pick up cars along the way. The brakeman in the picture is signalling the engineer to back up so that the couplers, or two "hands," will meet and close in a firm grip, holding the cars together.

THE COUPLERS' "GRIP"

37 In the picture, a fork-lift truck is coming out of a car with its load of tires. The tires had been placed in the car on "pallets." These are small stands on which several cartons or packages are placed. The fork of the truck is pushed under the pallet, which is lifted from the floor and moved into, or out of, the car.

The freight car you see here is called a boxcar because it looks so much like a box on wheels. Freight cars are great wanderers. A car may be sent to any place in the United States, Canada, Mexico, or Cuba to deliver a shipment of freight or to pick up a load.



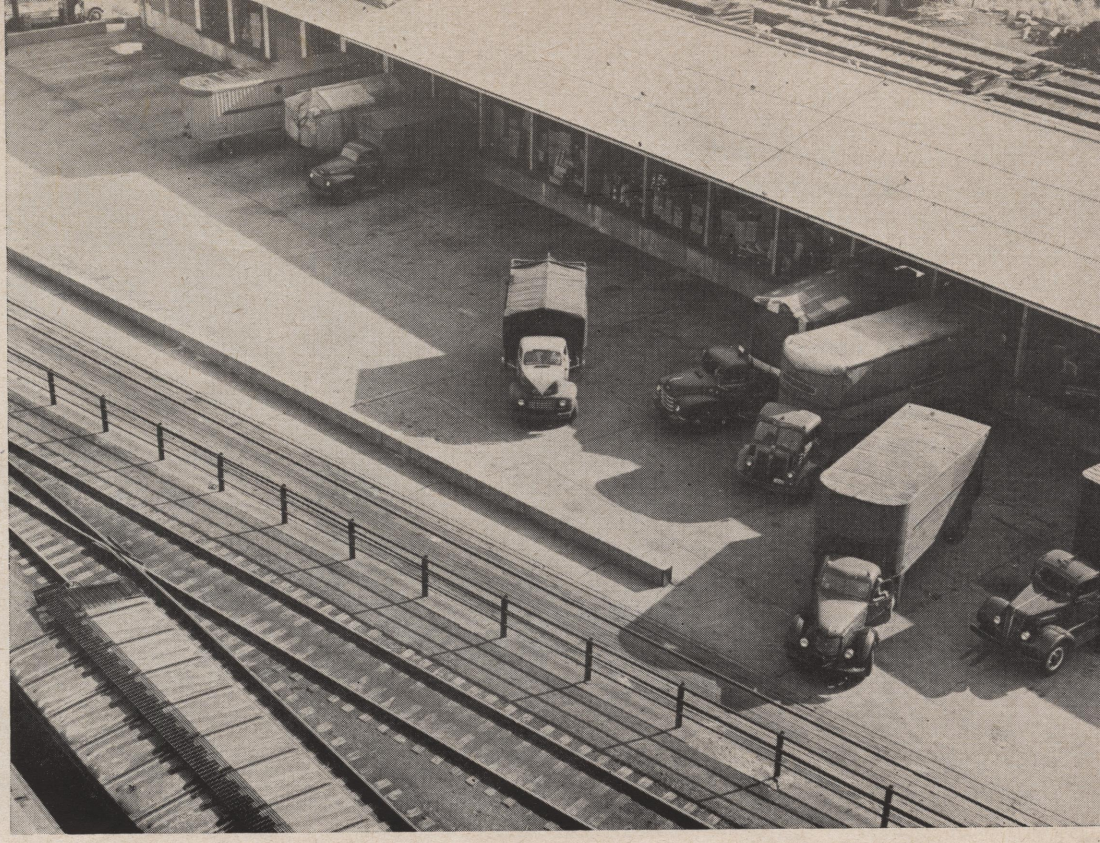
UNLOADING A BOX CAR

LITTLE "TRAIN" TRANSFERRING FREIGHT

38 There are stations for freight as well as for passengers. The size of a freight station depends upon the amount of business handled. This large freight station platform is just as high as the freight car floor. A little "train" pulled by a small power truck moves freight from the cars into the station. Sometimes they take the freight to another platform where it is loaded into delivery trucks, for transportation to the persons or companies to whom it is addressed. Many of the things which we buy in stores come through our local freight station.

39 When a local merchant wants to send freight by railroad, he delivers it to the freight station. If a package for the merchant is received at the station, a notice is sent to him and he sends for it.

In addition to the freight which is brought to the freight station by shippers or carried away from it by receivers, the railroads also pick up and deliver shipments—in the same way that the Railway Express Agency collects and delivers express packages. Such railroads have their own or hired motor trucks to maintain this service to the doors of factories, stores, and other places of business.



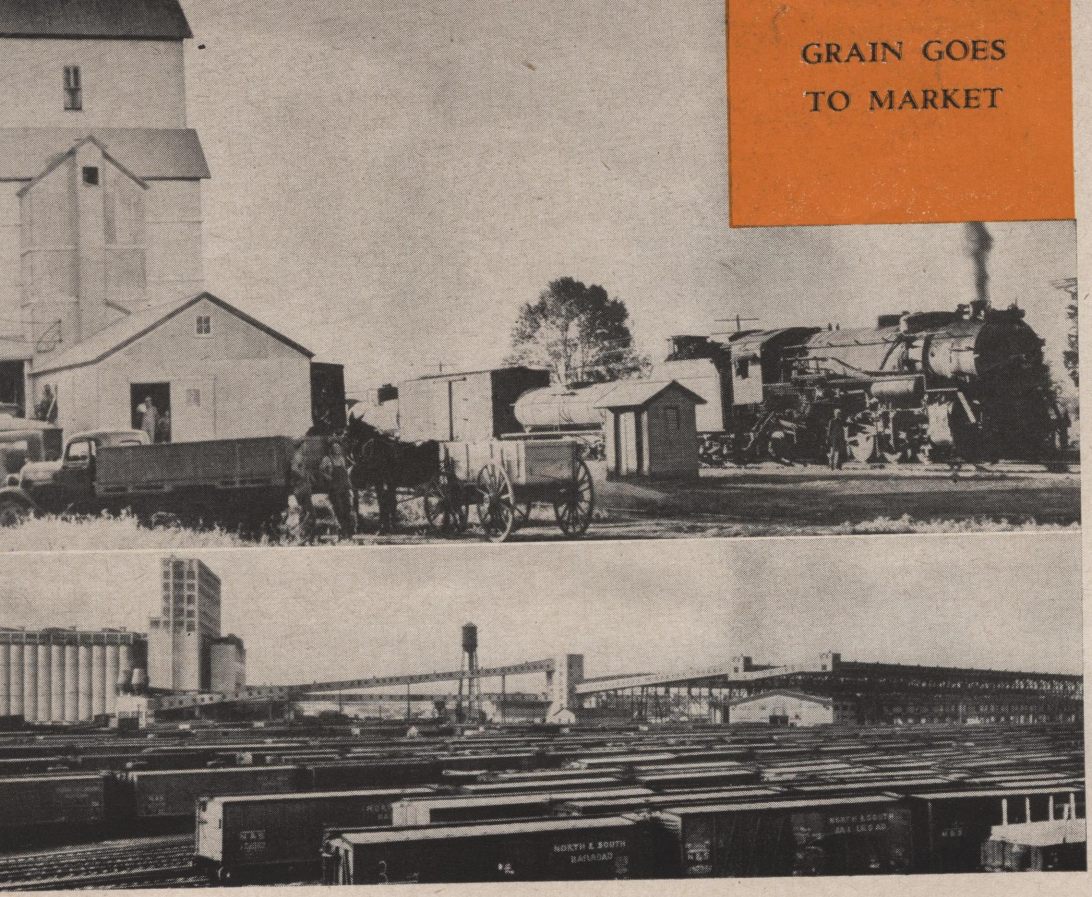
PICK-UP AND DELIVERY SERVICE

WHERE FREIGHT TRAINS ARE MADE UP

40 The freight yard is a busy place. Here, cars are sorted and made up into trains. A freight train starts its run from one freight yard and completes its run in another yard many miles away.

In some large freight yards, cars are run over the "hump" and put together in trains. The "hump" is a track that passes over a slight elevation of ground, forming an incline. When a car is "cut" from the train on the hump it runs down hill by gravity. A man in a tower sets switches so that the car goes to the track where it is wanted. To slow down or stop the car he pushes a button which causes "car retarders" in the track to press against the sides of the moving car wheels.

GRAIN GOES TO MARKET



41 Nearly all towns in the grain-producing areas have tall grain elevators. These country elevators are located on the railroad so that grain can be loaded directly into freight cars. Farmers bring wheat and other grains to the country elevator. The grain is lifted into bins by conveyors. From the bins it is poured or blown into freight cars through large tubes.

Freight cars take the grain to terminal elevators in the city. There it is cleaned, dried, and graded. Then it is again loaded into freight cars and taken to a mill to be made into flour, cereals, or other grain products.

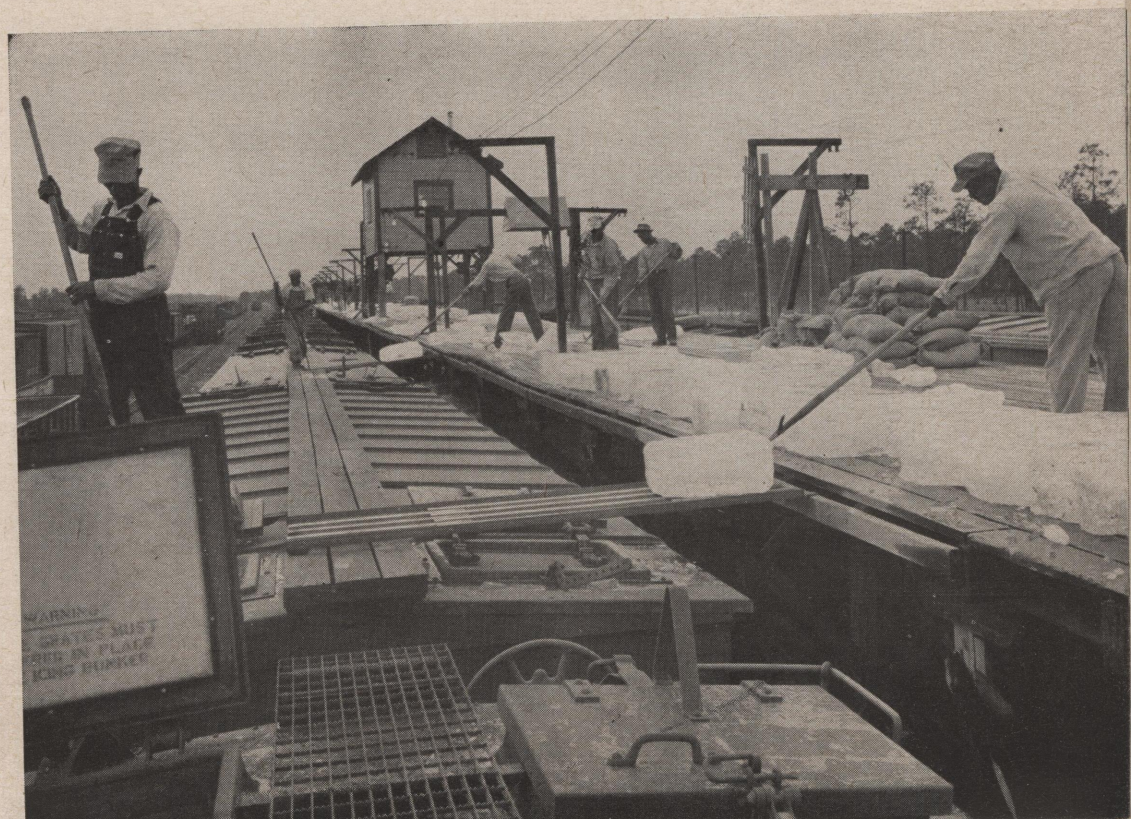
The principal flour-milling states are Kansas, Minnesota, New York, Missouri, Texas, Illinois, and Ohio.

ICING THE REFRIGERATOR CARS

42 Refrigerator cars serve the same purpose as refrigerators in our homes. They keep fresh fruits, vegetables, dairy products, meats, fish, and other foods cold, so they will not spoil on the way to market.

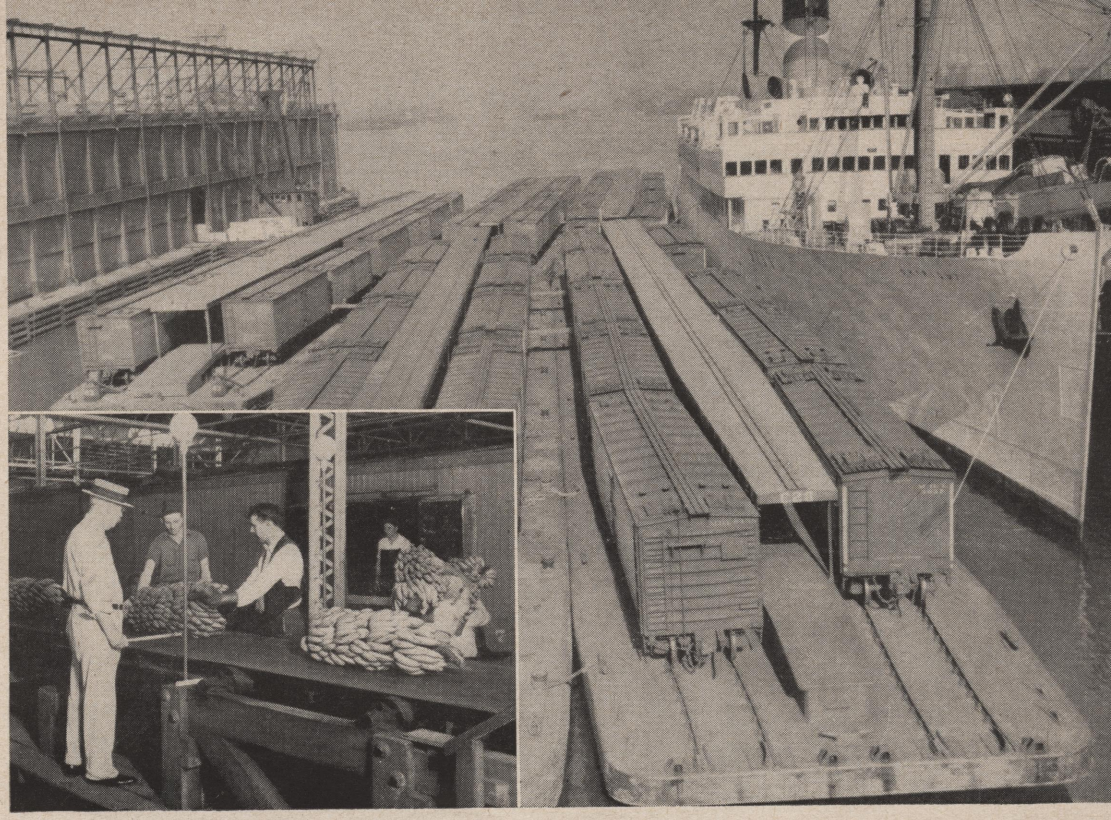
The men in the picture are putting ice into refrigerator cars. A moving chain belt brings cakes of ice to the icing platform. The men then drop them through trap doors, called hatches, into bins or bunkers. The floor and walls of the car are insulated so that when the doors and hatches of the car are closed, the ice will keep the interior of the car cold.

In cold weather, refrigerator cars are used without ice to carry some perishables which might freeze in ordinary boxcars.



43 Bananas travel thousands of miles to reach our tables. Most of the bananas we eat grow in Central America, South America, and the West Indies. They are shipped over little railroads to the seaports; by steamships to our ports; then by railroads to cities and towns all over the United States.

Sometimes bananas are unloaded from a steamship to refrigerator cars on large car floats, or "lighters," as seen in the larger picture. The floats are then towed to a dock, their tracks are connected with railroad tracks and the cars are hauled away to a freight yard where a banana train is "made up." Sometimes one ship will bring enough bananas to fill two or more trains.



BANANAS COME BY SHIP AND RAIL

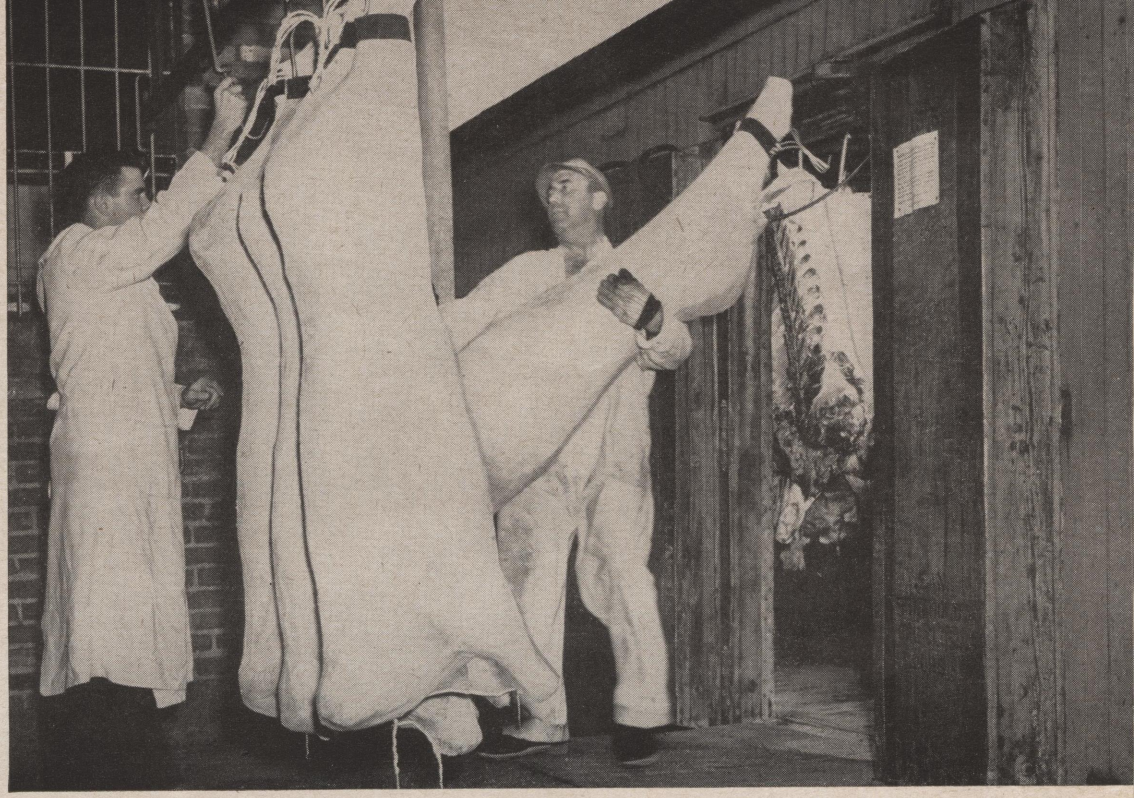
LIVESTOCK ON THE WAY TO MARKET

44 Our railroads carry cattle, calves, hogs, sheep, and lambs from the farms to the stockyards in the cities. Cars used for this purpose are like boxcars except that the side walls are made of slats set two or three inches apart to give the animals plenty of fresh air. Many cars that carry hogs and sheep have two decks.

Animals and poultry on their way to market are fed, watered, and looked after by caretakers who travel on the train. On long journeys, the animals are removed from the train somewhere along the way and kept for several hours in "resting pens."

45 Fresh meats are chilled or frozen in meat packing plants and wrapped before being loaded into cars with controlled temperatures. In the picture, men are unloading sides of beef from refrigerator cars. These cars are equipped with steel bars upon which to hang the meat. Often poultry, dairy, and other food products are loaded and shipped in the same car with fresh meats.

Before there were refrigerator cars, fresh meats could not be shipped long distances without spoiling. Today, railroads bring us perishable products no matter how far we may live from the places where they are produced.



UNLOADING FRESH MEATS

46 Millions of Americans depend upon the railroads to bring their daily supply of fresh milk and cream. In many instances, milk and cream are carried hundreds of miles to market, requiring the utmost care from the time they leave the farms until they reach our tables. Milk must be kept perfectly clean. It must be kept cold, but not too cold. Some milk is transported in insulated glass-lined steel tank cars; some is shipped in large cans like the ones in the picture. Cars are sometimes fitted with shelves so that the cans can be loaded in tiers.

BRINGING MILK TO THE CITY

47 The forest industry is a large user of transportation. After trees are felled and trimmed in the forest, they are taken to the mills. Then the lumber and products of the mills must be taken to the places where they are needed. Railroads take things from where they are produced and deliver them to places where they are needed.

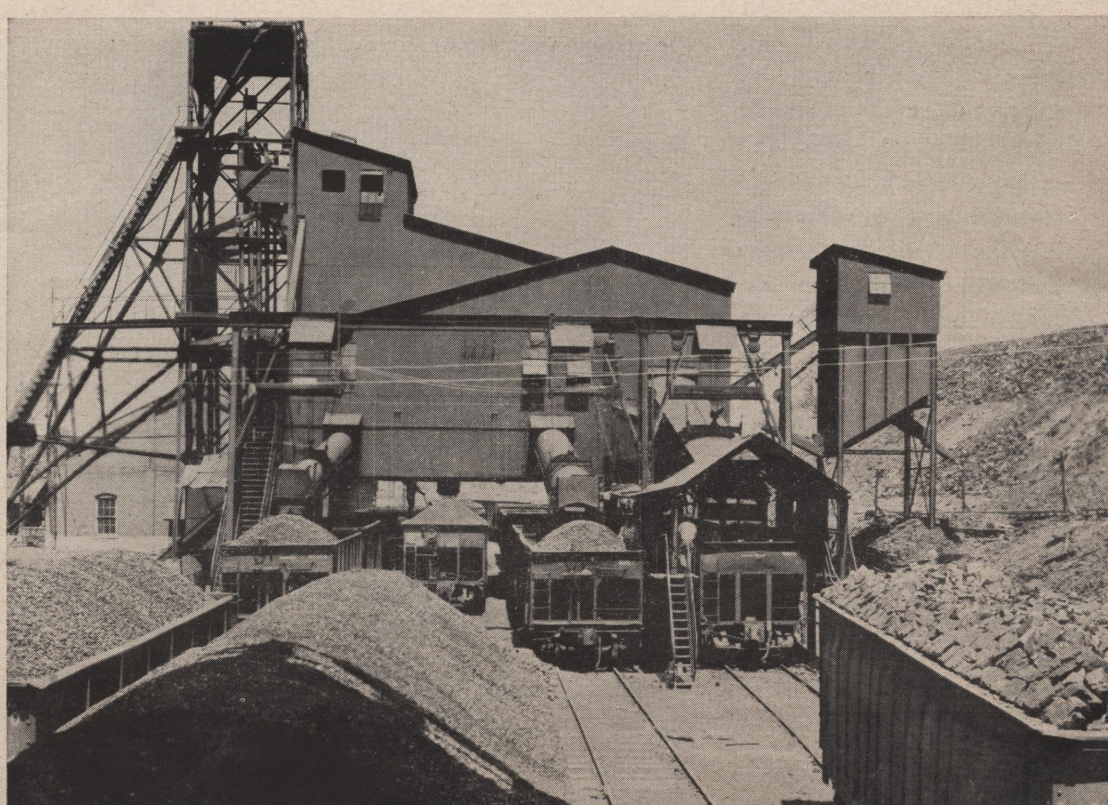
Railroads themselves are large buyers and users of forest products. They buy crossties, telephone and telegraph poles, bridge timbers, piling, fence posts, and lumber for buildings, platforms, docks and wharves, boxcars, and other uses.

FOREST PRODUCTS MOVE BY RAIL

48 Coal mines and railroads work together. Coal mines help the railroads by supplying them with fuel for their locomotives, shops, stations, and offices, and by furnishing coal to haul. Railroads help the coal mines by bringing them machinery, tools and other supplies, by purchasing large quantities of coal for railroad uses, and by hauling coal to places where needed.

In this picture, several sizes of coal are being loaded into freight cars at the mine. Both hopper cars and gondola cars carry coal. Railroads take the coal to factories and mills, railroad coaling stations, coal yards in cities and towns, and to seaports and lake ports.

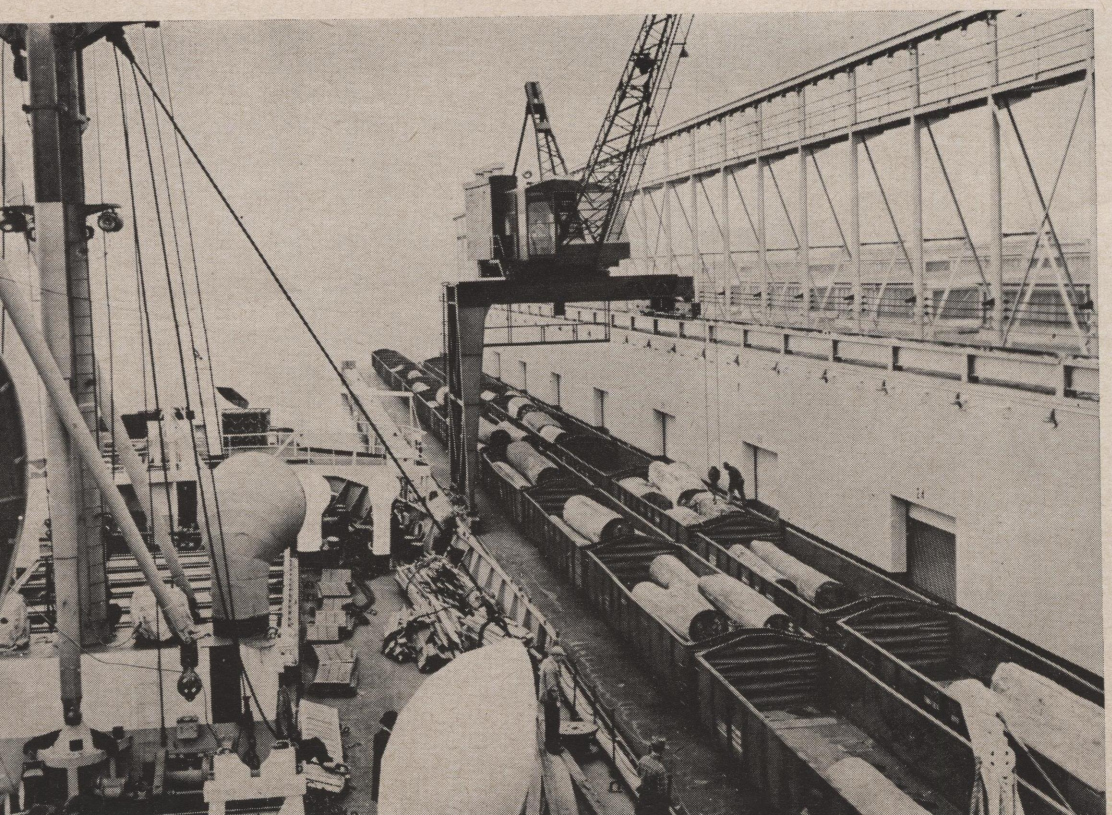
LOADING COAL CARS AT THE MINE



DUMPING COAL FROM CARS INTO SHIPS

49 Many years ago a large crew of men toiled for days to take coal or ore from cars and load it into a ship. The modern way is to use dumping machines like the one in the picture. This machine grips a loaded coal car firmly, lifts it 50 or 75 feet above the track, and then turns it over, dumping the coal into a "pan" attached to a chute leading to the ship's hold. The empty car is then returned to the track, and as soon as it is pushed out of the way, another loaded car is brought into position for dumping. The astonishing thing is that all of this takes only about a minute.

RAILROADS SERVE THE SEAPORTS



50 The United States trades with nations all over the world. Thousands of ships are employed to carry the products of our farms, forests, mines, and factories to other lands and to bring the many things we need from other lands. Many trainloads of freight arrive and depart at our seaports each day.

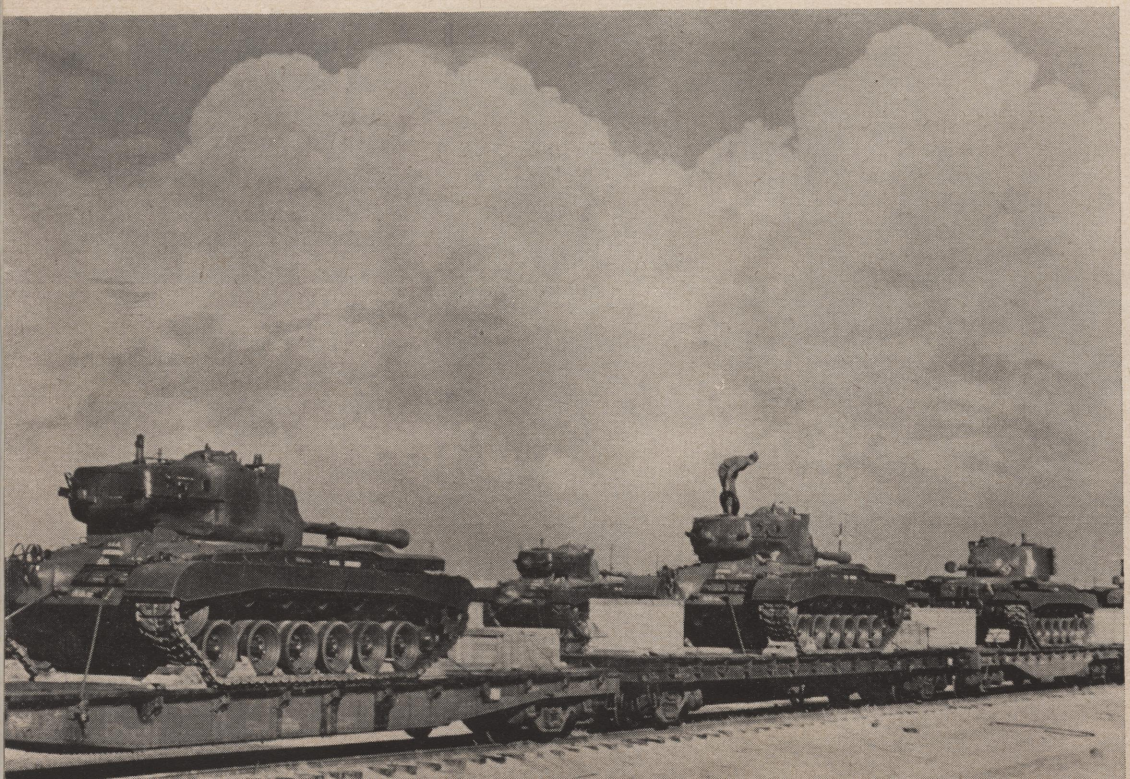
This picture shows mahogany logs being unloaded from ships into gondola cars on a railroad dock. The dock is where freight is transferred from ship to car or from car to ship. At every seaport the railroads have freight yards and warehouses. Many railroads have their own docks and other buildings.

51 During World War II, the railroads handled 97 per cent of all organized military travel. They carried millions of soldiers, sailors, marines, and coast guardsmen to and from training centers and seaports. They carried millions of members of the armed forces on trips to and from their homes and recreational areas. They also operated numerous hospital trains carrying wounded servicemen and many other trains carrying prisoners of war.

In peace, as in war, our government maintains an Army, a Navy, and an Air Force, and the railroads must be prepared at all times to carry military personnel and their equipment where and when needed.

SOLDIERS ON THE MOVE

SPEEDING MILITARY EQUIPMENT BY RAIL



52 In wartime, railroads are the vital life lines of the nation. Only the railroads are equipped to transport heavy war goods such as tanks, big guns, steel for battleships, engines, boilers, turbines, and many other things.

During World War II, railroads carried 90 per cent of all military freight. They delivered millions of carloads of materials and supplies to camps and bases. They brought raw materials to mills, arsenals, and manufacturing plants, and took the products of mills and factories and arsenals to military bases and to seaports for shipment overseas. This nation could not defend itself successfully without railroads.

53 Nearly every important factory or mill is located on a railroad. The railroad and the factory work together. Railroads bring fuel and raw materials to the factory and take the manufactured products to markets. To make one article—such as a bicycle, a sewing machine, or a radio—dozens of different materials are needed, and these may come from places many miles away. Often the parts are made in factories in different cities and assembled in another place. Railway transportation makes this possible. Tracks usually run directly into a factory where cars can be loaded and unloaded conveniently.

FACTORIES ARE FED RAW MATERIALS BY TRAINS

RAILROAD MATERIAL YARD AND STOREHOUSE

54 Railroads buy thousands of different items — and these purchases are made in many cities and towns throughout the country. Railroads use fuel, tools, and machines. They use iron and steel products, forest products, and a wide variety of manufactured goods. The railroad storehouse resembles a big hardware store where everything is neatly kept on shelves, as seen in the right-hand picture.

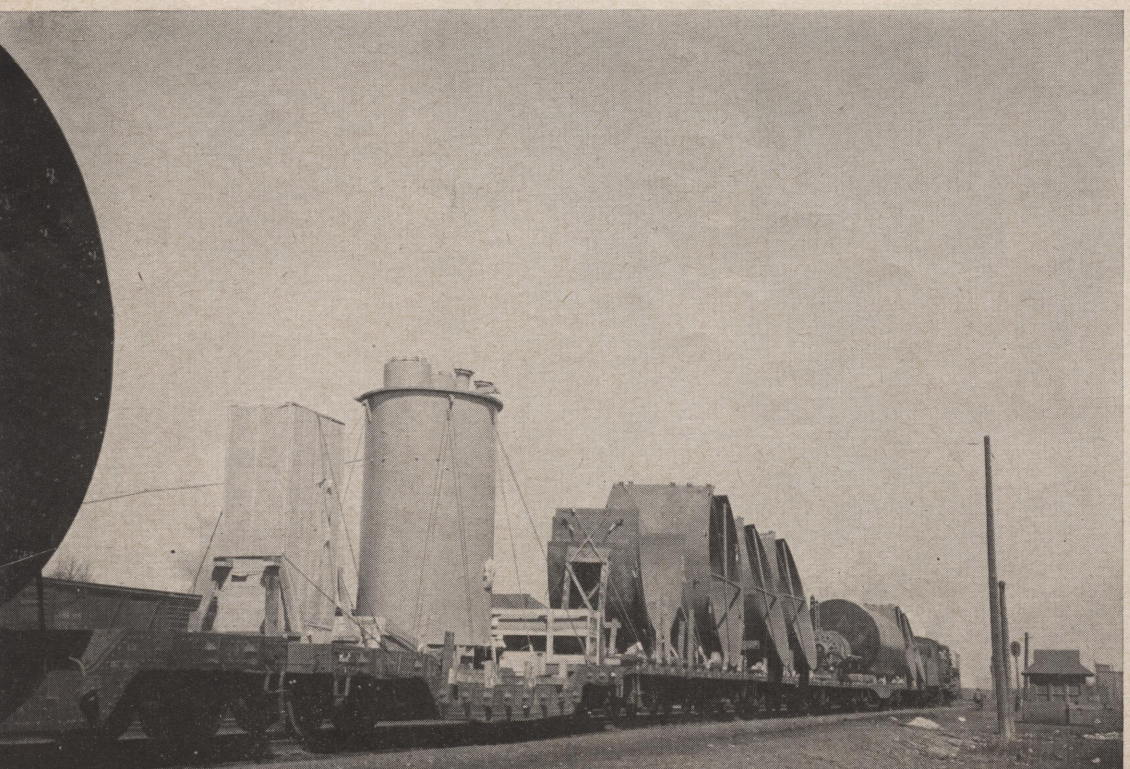
Storage yards are used to keep the big, bulky things such as rails, pipes, springs, and wheels. The left-hand picture shows how these supplies are kept outside in neatly stacked piles.

55 The larger the railroad, the more offices it will have. The main office handles the work of the president and other executive officers. In addition, each railroad has offices scattered in cities and towns along its line. Some railroads have traffic offices in cities not on their lines, to sell tickets and route freight shipments.

Every railroad has much office work to do. For example, the top picture shows employees sorting waybills in a filing "wheel." The papers for any freight shipment can be found, quickly and easily. Below, carload traffic records are kept in the card tray filing system. The trays are on rollers and can be moved to the operators.

IN A RAILROAD OFFICE

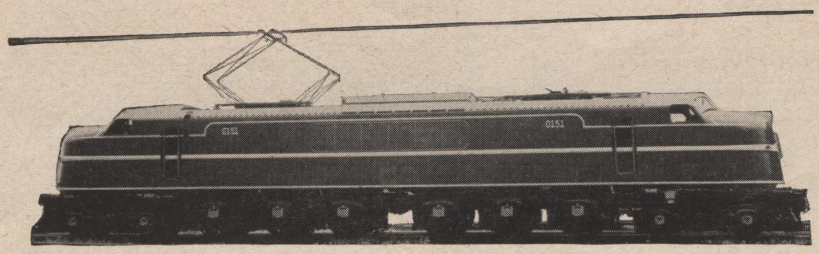
RAILROADS CARRY "ANYTHING, ANY TIME"



56 The picture shows some of the extra-large and heavy shipments carried by railroads. Railroads are equipped to handle every kind of shipment—big or little—from bobby pins to battleship turbines. The heaviest freight shipment carried to date weighed 673,000 pounds. The tallest shipment stood 28 feet above the rails. Railroads have carried single shipments up to 183 feet in length.

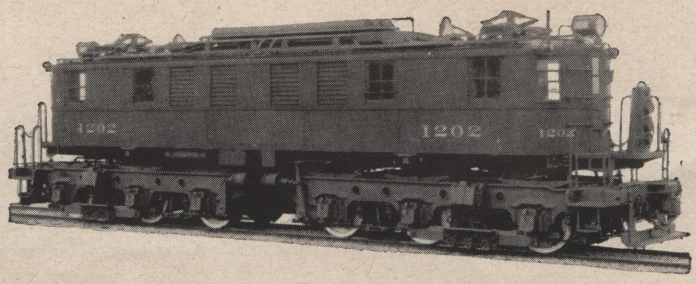
Among the many big shipments moved by train are engines and turbines, giant guns for the Army and Navy, and generators. Heavy machinery for mines, automobile factories, steel mills, and other plants is regularly handled by railroads.

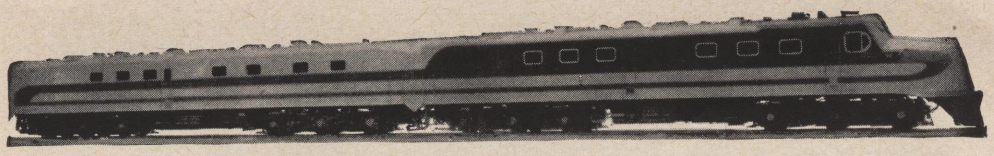
ELECTRIC AND DIESEL-ELECTRIC LOCOMOTIVES



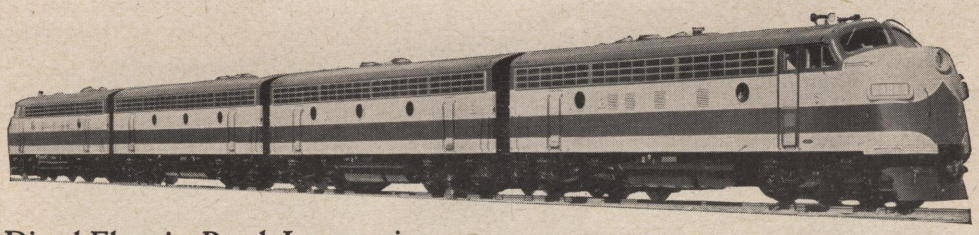
Electric
Locomotive
(2C+C2)

Electric
Locomotive
(C+C)



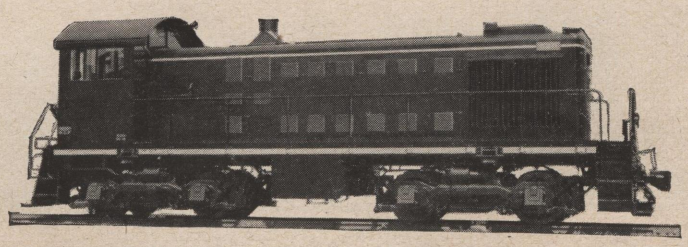


Diesel-Electric Road Locomotive

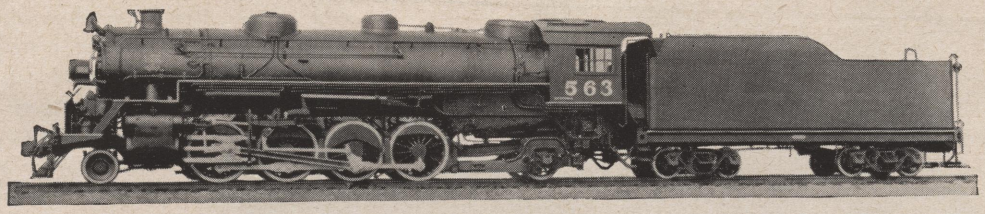


Diesel-Electric Road Locomotive

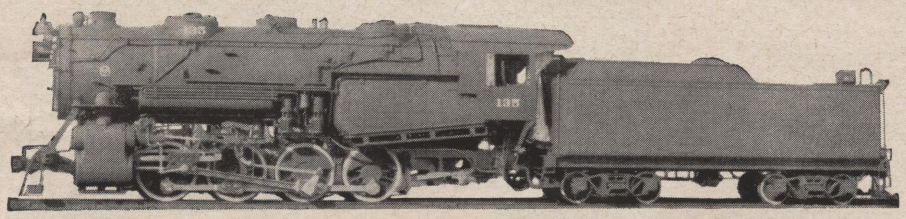
Diesel-
Electric
Switching
Locomotive



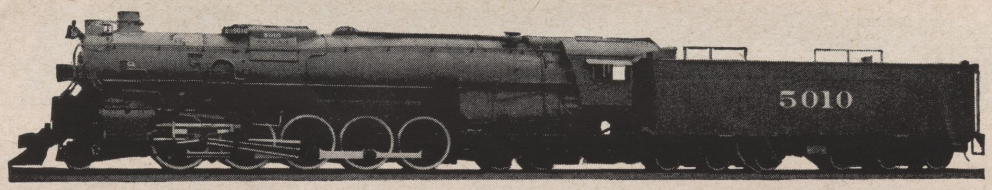
STEAM FREIGHT LOCOMOTIVES



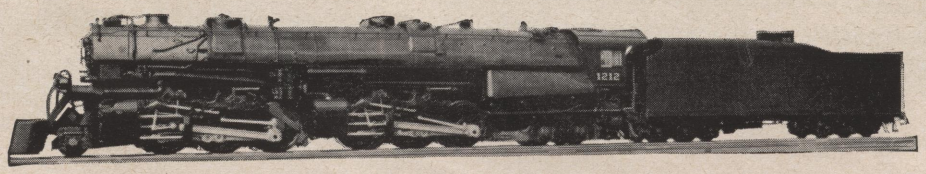
2-8-2 (Mikado)



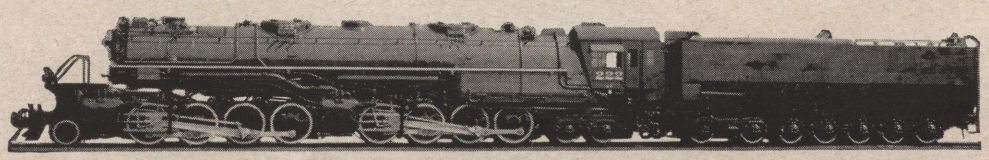
0-8-0 (Eight-wheel Switcher)



2-10-4 (Texas)

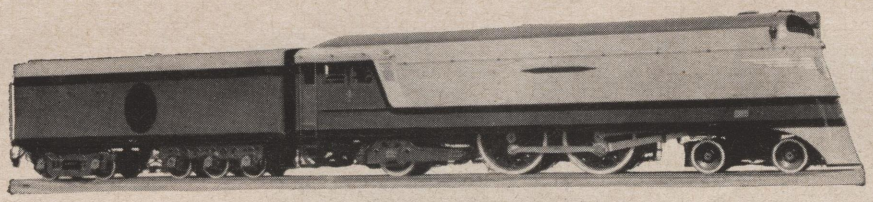


2-6-6-4 (Mallet: Articulated)

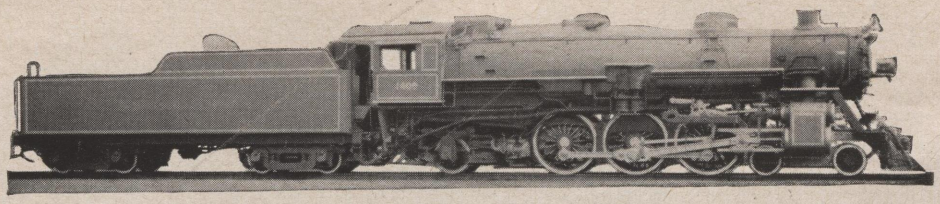


2-8-8-4 (Yellowstone)

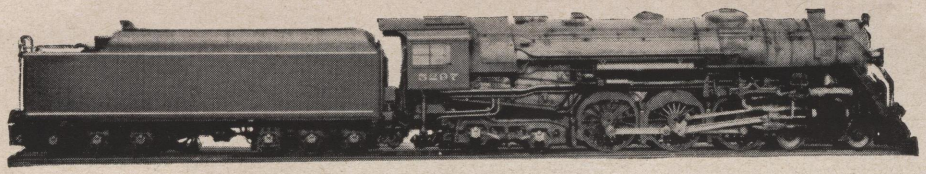
STEAM PASSENGER LOCOMOTIVES



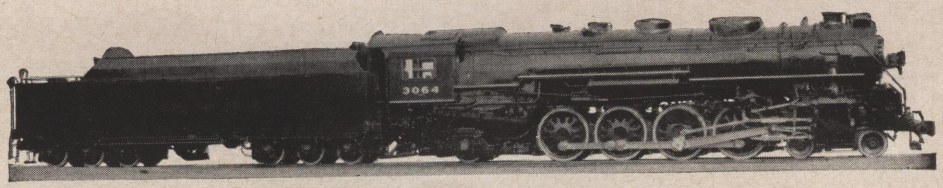
4-4-2 (Atlantic)



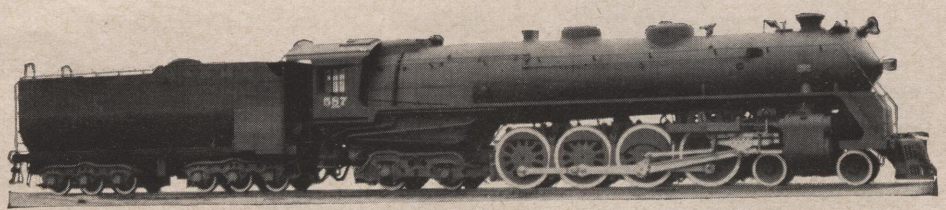
4-6-2 (Pacific)



4-6-4 (Hudson)

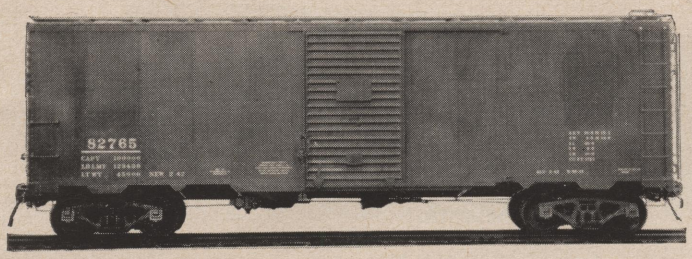


4-8-2 (Mountain)

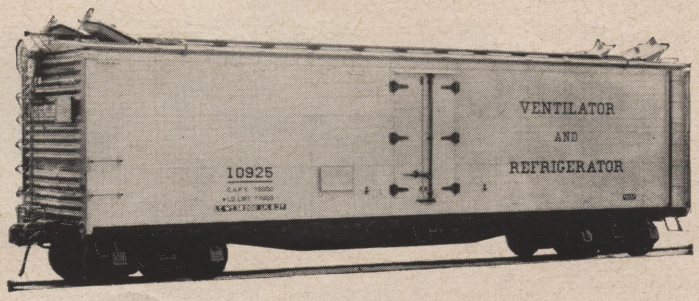


4-8-4 (Northern)

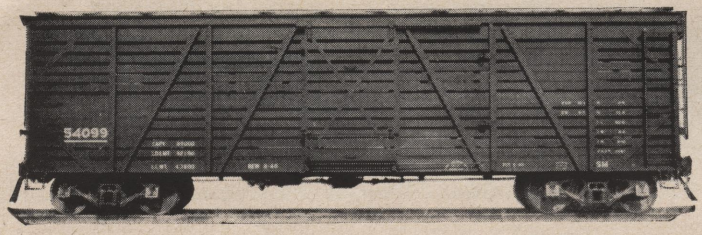
FREIGHT TRAIN CARS



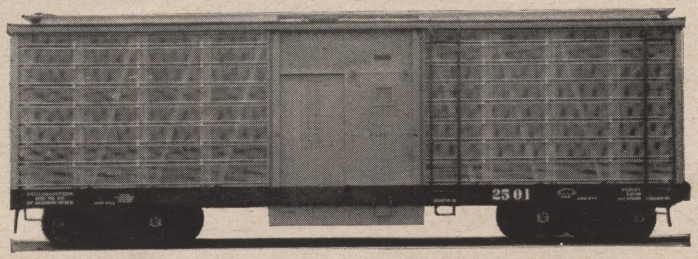
Boxcar



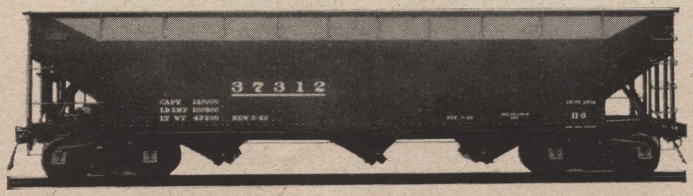
Refrigerator Car



Stock Car



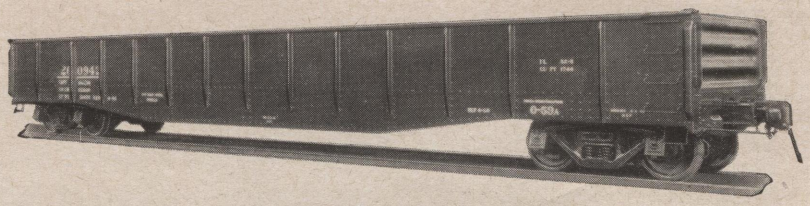
Poultry Car

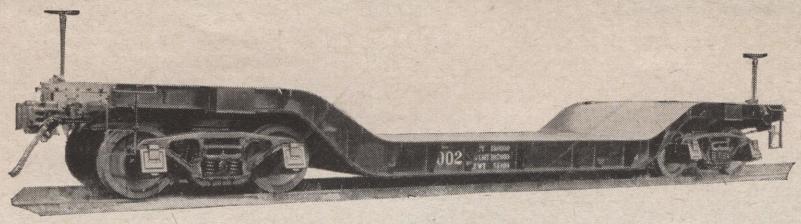


Hopper Car

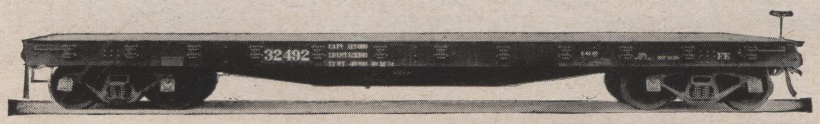
FREIGHT TRAIN CARS

Gondola Car



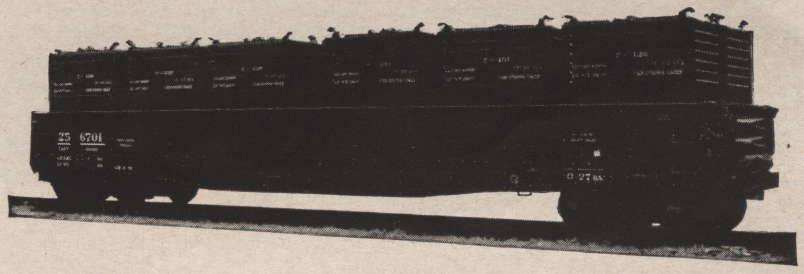


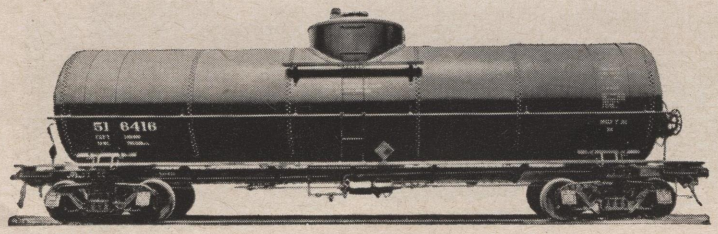
Depressed-Center Flat Car



Flat Car

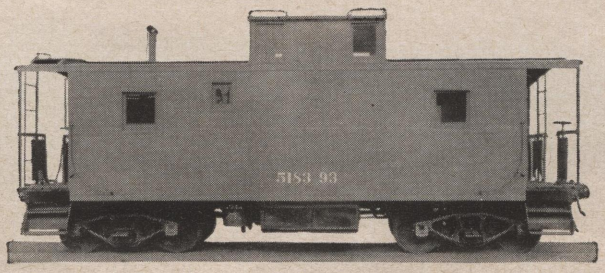
Container Car



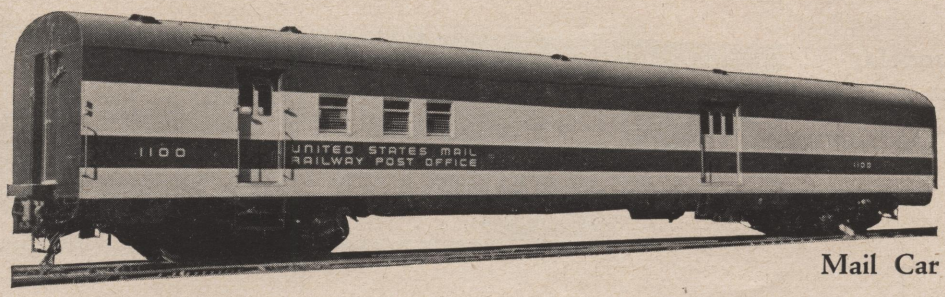


Tank Car

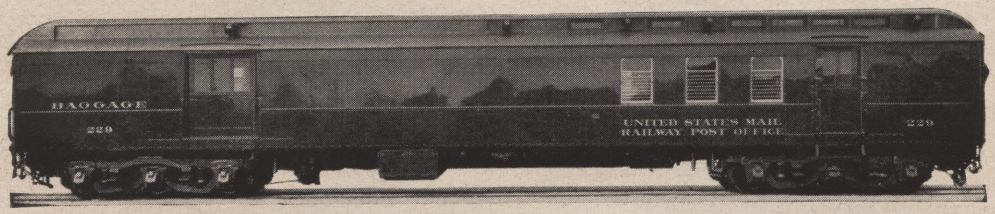
Caboose



PASSENGER TRAIN CARS

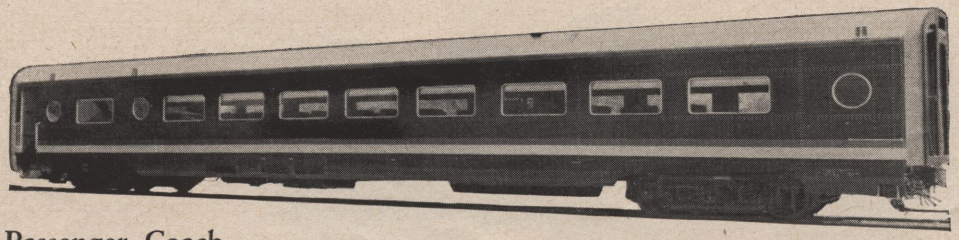


Mail Car

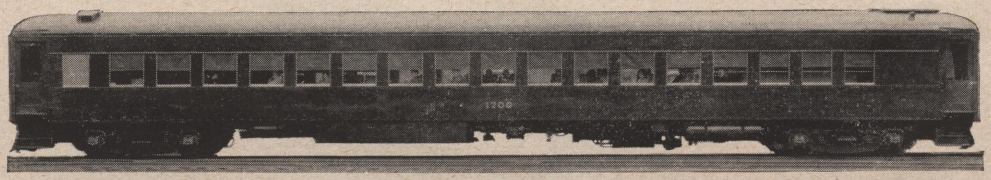


Baggage and Mail Car

Express Car



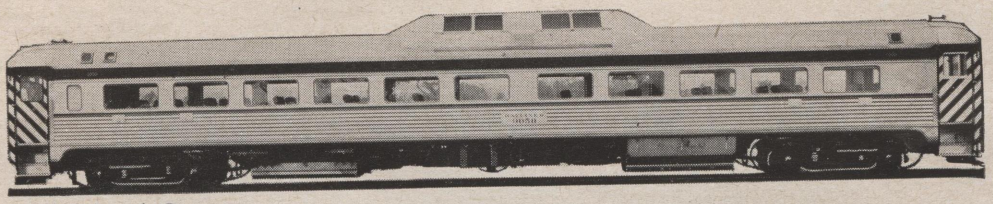
Passenger Coach



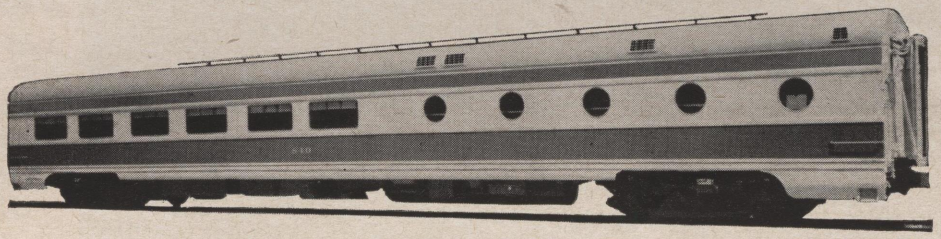
Passenger Coach

PASSENGER TRAIN CARS

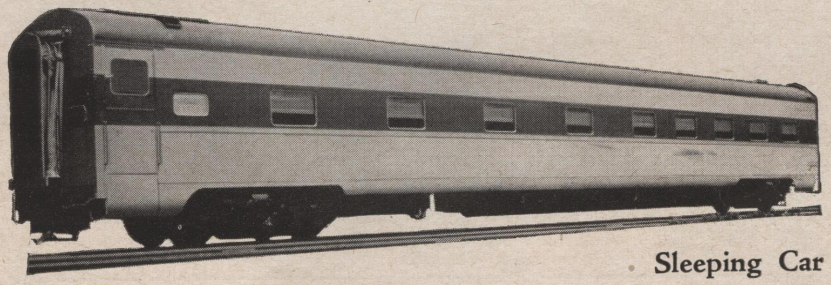
Streamlined Passenger Coach



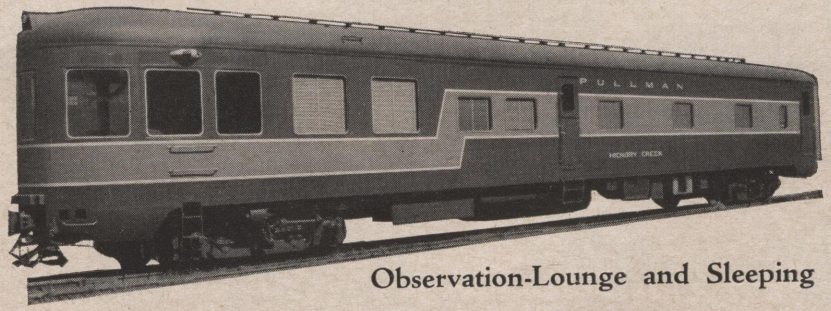
Rail Diesel Car



Dining Car



Sleeping Car



Observation-Lounge and Sleeping Car

The Railroads

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This romance of railroading and, in late years, an increased awareness of the essential nature of railroads, have stimulated a tremendous interest in railroad history, equipment, organization, services, operations, and so on. Teachers may obtain railroad information by writing the office indicated below.

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